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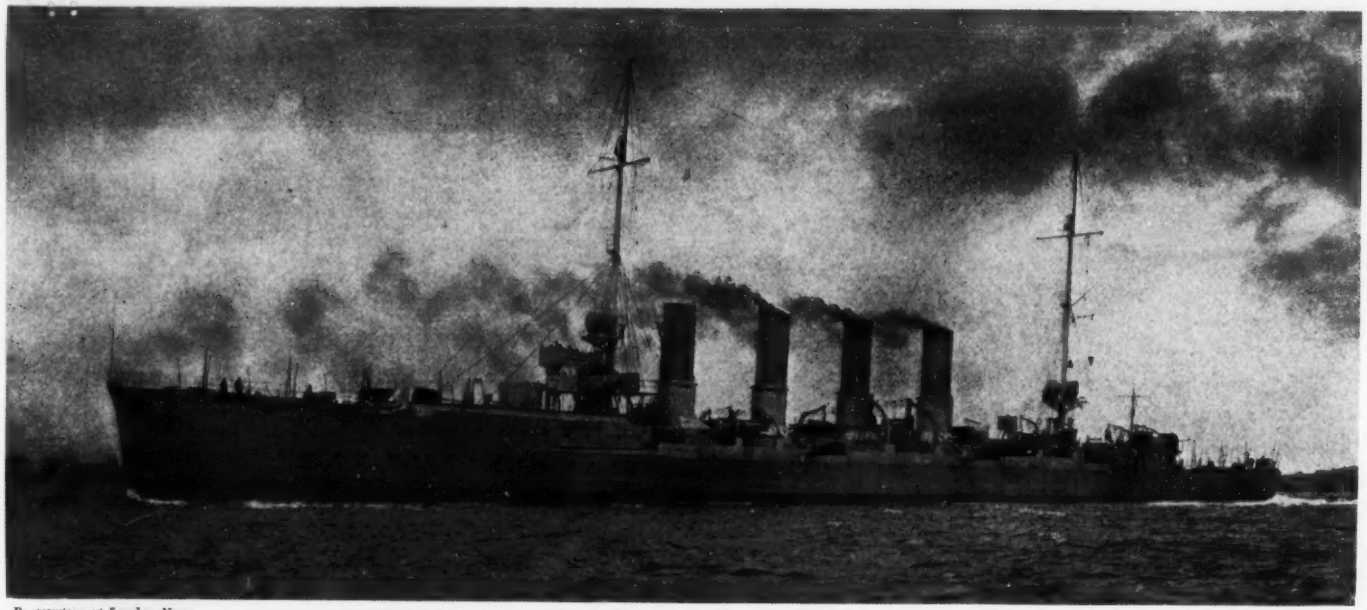

By courtesy of London News

THE "ROSTOCK," ONE OF FOUR GERMAN LIGHT CRUISERS SUNK IN THE BATTLE OF JUTLAND

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. 42, No. 4 JULY-AUGUST, 1916 Whole No. 164

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

LARGE *VS.* A GREATER NUMBER OF SMALLER BATTLESHIPS

Motto: Veritas me dirigit.

By LIEUT. COMMANDER THOMAS LEE JOHNSON, U. S. Navy

Would the defence of our coast, and incidentally aggressive action, be better provided for by the expenditure of a given amount in the construction of the largest type of battleships, or in more of a smaller size?

Before proceeding with the argument it will be well to lay down some necessary definitions in order that a "wardroom" argument may be avoided and some conclusions reached. "Large" and "Small," especially in reference to battleships are certainly relative terms! Are we to consider as large a battleship of 32,000 tons displacement, or are we to think of yet larger units that are well within the realm of possibilities?

What is a large battleship and conversely what is a small one? Who shall say? Certainly the large ship of to-day is the small one of to-morrow. It is evidently impossible to fix upon dis-

SECRETARY'S NOTE.—This essay was awarded the prize of $1000 offered by Mr. Walter Lippincott, of Philadelphia, for the best essay on the subject, "Large *vs.* A Greater Number of Smaller Battleships; that is, would the defence of our coast, and incidentally aggressive action, be better provided for by the expenditure of a given amount in the construction of the largest type of battleships or in more of a smaller size."

The competition was conducted by the Board of Control of the U. S. Naval Institute, which rendered the decision. The prize essay is here published through the courtesy of Mr. Lippincott and the author. J. W. G.

placement as a criterion. Already we have the *Bismarck*, a merchant ship of 55,000 tons displacement; length, 955 feet; beam 100 feet; depth, 65 feet, and engines developing 61,000 I. H. P. On the other hand our largest battleship (*New Mexico*) will have 32,000 tons displacement; length, 600 feet; beam, 97 feet; draft 28¾ feet. As regards displacement, then, we can stil double the size of our largest designed battleship.

In regard to armament no limit has yet been reached. Five years ago the popular gun was the 12-inch 50-caliber of about 2900 f. s. velocity. Since then the increase has included the 13.5-inch, the 14-inch, and now the 15-inch, while in this country a successful 16-inch gun has been built and proved. According to the newspapers Rear Admiral C. J. Badger, ret., member of the General Board, in his hearing before the House Naval Committee, stated that the next battleship designed will carry ten 16-inch guns. Going yet further we have the German 42 cm. siege howitzers in actual use and now we begin to hear the first demands for the preparation, at least, of the designs for an 18-inch gun.[1] Is there any guarantee that 16 or 18 inches will limit the caliber of guns? Has not the present war developed startling progress in siege guns?

Even though the limit to the size of guns were in sight we have yet to determine the limit to the number that any one ship can carry. In the last ten years we have progressed from eight 12-inch guns (*Michigan*) to twelve 14-inch guns (*Pennsylvania*). In the meantime the French have laid down ships that are to carry twelve 13.4-inch, and the Italians two ships that are to have a battery of thirteen 12-inch guns. Judging from the progress to date is there any reason to believe that the limit to the number has been reached? Surely, if the displacement continues to grow, the number of guns may be expected to grow also.

If we take up the question of speed, we are more at a loss to say what the limit will be than in regard to any other point. With 32,000-ton liners being driven across the Atlantic at an average speed of 26.4 knots (*Mauretania*); a battle cruiser of 28,000 tons making as high as 33 knots (*Queen Mary*); an 1800-ton destroyer (the *Swift*) making 36 knots, and motor boats developing 46.79 knots (*Tech Jr.*); one would be bold, indeed, were he to attempt to prophesy how high speed will go.

[1] Yarnell, U. S. Naval Institute, Jan., 1916.

As to armor there is surely no limit in regard to that. Given the greater displacements we can expect to see increase proportionately the thickness of armor and the total weight assigned to it. Hence it appears that neither by displacement, size or number of guns, speed or protection can be defined the term "large" as applied to battleships.

How can we define the term? It is really very simple after all! *A large battleship is one that embodies more fighting strength than any built or building by a possible enemy.* Conversely, *a small battleship is one that embodies less fighting strength than any built or building by a possible enemy.*

The question now reduces to these terms: "Shall we continue to build battleships of greater military power than those built contemporaneously by any possible enemy, or shall we spend the same amount of money for a greater number of second class battleships?" I say second class advisedly, because anything less than the best is second class when the safety and honor of our country is at stake.

Unit cost cannot be reduced without reducing size and size cannot be reduced without sacrificing military power. Any unit carrying less military power than another of the same class is relatively second class.

We are spared an academic discussion on large *versus* small battleships by the defining sentence of the proposition, viz., "Would the defense of our coast, and incidentally aggressive action, be better provided for, ... ?" We are then to discuss battleships built for a particular purpose, and not the general question of large *versus* small ships.

Were the United States properly organized for defense, the type and number of battleships as well as all other military units would be the logical result of the correct estimate of the military situation. Our statesmen, and especially the President, the Secretary of State and Congress, would determine and fix the policy of the nation. This policy would express the national aims, aspirations or fears. At present this policy embraces the following tenets: (a) The Monroe Doctrine; (b) The protection of the Panama Canal; (c) The Maintenance of the Rights of Neutrals; (d) Exclusion of Asiatic Races; (e) The Open Door in China. Conversant with the internal conditions and national

aspirations of other nations, our statesmen would determine the points at which our policy would be most likely to conflict with theirs, thereby fixing our most probable enemy.

The next step in national defense would lie within the province of a National Defense Council. This council knowing the policy of the nation, and hence our most probable enemies, together with the latter's racial characteristics and military strength, would deduce the most probable areas of war, the kinds of campaigns needed and the military strength required to push the campaigns to a successful issue for the defense and safety of the United States.

The military strength having been determined, the task would be taken up by the General Staff of the army and the General Staff of the navy. Each would determine the number, kinds and strength of the necessary military units together with all the questions pertaining to creating, maintaining and training them for battle. The kinds of units necessary for the navy having been fixed by the General Staff, the technical bureas of the Navy Department would be called upon to give material expression to these general plans. Finally, Congress would be asked to appropriate the sums necessary to construct the military units deemed necessary to enforce upon the water the national policy as enunciated by the statesmen. The policy having been fixed there should be a clear understanding of the value attached to the different articles in it. In other words what would the people consider them worth? If the cost as represented by the estimates of the General Staffs exceeds the value, the policies should be abandoned.

That England and France as well as Germany, Italy, Russia and Japan have logical and enduring naval policies is evident. Von Maltzahn[2] says:

> Our Fleet Law of 1900 was founded on "Defence by Battle." It states in its preamble that "Germany must possess a battle fleet of such strength that war, even for the most powerful naval adversary, would involve such risks as to endanger the latter's supremacy." By "Defence by Battle" is meant the intention to bring the enemy to battle on the high seas. It cannot be hoped to defeat him decisively once for all—the difference of strength which

[2] Von Maltzahn, Journal of the Royal United Service Institution, June, 1914.

is a presumption of the strategic defensive would indeed prevent this—but it must be able to deprive him of so much of his strength that what remains is not sufficient for his purpose.

In 1889 a committee of admirals reported that England should possess a fleet equal to those of the next two powers plus ten per cent.

The admitted final aim of our naval policy is to maintain a force which will match the navies of France and Russia, or any pair of the strongest naval powers that may be combined against us in war. . . . . We are maintaining our policy by having the larger number of larger ships.[3]

However, in 1900, Germany, until then contented with a moderate sized navy, passed the fleet law which doubled the number of battleships, increased the number of armored cruisers, and by a continuing ship-building program laid a firm foundation for the rapid rise to the position of second naval power which she can now rightfully claim. In 1906, 1908 and 1912 her building program was still further augmented until her final scheme called for 61 capital ships of less than 20 years of age.

In 1900 France held as her standard 28 battleships and 24 armored cruisers as opposed to Germany's 19 battleships, 12 armored cruisers and 8 armored coast defense vessels. In spite of the large increase authorized by the German laws of 1900, 1906 and 1908, France as late as 1909 accepted the principle of only 28 battleships.

Since 1900 she had therefore decreased her estimates by 24 armored cruisers, in spite of the many previous decisions of the *conseils supérieurs.* This decision gave rise to much feeling throughout naval circles and was known as the program of "resignation."[4]

The unprecedented growth of the German navy and merchant marine immediately became the concern of England, and it was not long before every German act became to the English a direct threat. In viewing with alarm the growth of German power, especially that of the merchant marine, the English statesmen were correct, for it was down the golden lane reflected by the water that the Germans hoped to travel to their "place in the sun."

[3] Colomb, The Essential Elements of Modern Sea Power, Engineering Magazine, September, 1898.

[4] Darrieus, War On the Sea.

England lives by the sea and nothing so quickly stirs the English to action as a threat of rivalry in the world's carrying trade. That Germany realized wealth was to be gained from the sea is evident. In 1912 Von Maltzahn, in the article previously referred to, expresses the German view as follows:

> The sources of welfare of every nation, now as ever, are within the country itself, whether it be mineral treasure, in natural home products, or in the value of productive labor; but the economic activity of the great commercial states has brought it to pass that no state can any longer dispense with the open highway of the sea. Naval warfare can touch only one limb of the whole system of traffic and commerce referred to above, namely, sea borne trade, nevertheless, the interruption of sea borne trade hampers or brings to a standstill almost the entire system of economic activity, and demonstrates that the whole country is dependent on the sea and therefore on naval warfare.

From 1900 to 1914 the English statesmen were not idle and gradually a new alliance was formed with France. In the meantime the naval building program had become so burdensome that the likelihood of trouble with France having been obliterated, the preponderance of the English navy was gradually reduced to 60 per cent over that of Germany.[5]

In 1903, the General Board reported the first building program for the United States navy. It then stated that by 1919 we should be possessed of 48 battleships. No definite policy having been formulated by our statesmen and no National Defense Council existing to decide upon campaigns and needed military forces, the General Board, without any legal status, assumed, and has since maintained, insofar as it has been maintained, our naval policy. In 1915, a new policy, born of the terrible strife now existent in Europe, was voiced by the General Board[6] as follows:

> The navy of the United States should ultimately be equal to the most powerful maintained by any other nation of the world. It should be gradually increased to this point by such a rate of development year by year, as may be permitted by the facilities of the country, but the limit above defined should be attained not later than 1925. . . . . The General Board believes that the course of the present war in Europe affords convincing reasons for modifying the opinion which it has expressed for the past 11 years as to the proper size of the navy.. A navy in firm control of the seas from the outbreak of the war is the prime essential to the defence of a country, situated as is the United States, bordering upon two great oceans.

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[5] Hurd, The Command of the Sea.

[6] Report of the Secretary of the Navy, 1915.

A navy strong enough only to defend our coast from actual invasion will not suffice. Defence from invasion is not the only function of the navy. It must protect our sea borne commerce and drive that of the enemy from the sea. The best way to accomplish all these objects is to find and defeat the hostile fleet or any of its detachments at a distance from our coast sufficiently great to prevent interruption of our normal course of life.

The cases of England and Germany have been thus lightly touched upon to show that the two leading naval powers of the world have well defined naval policies as the direct result of their national policies. Later I will show that these policies determine the size and number of battleships that these two nations have built.

So should it be in our country! We should have a well defined national policy which in itself would determine the number and size of battleships needed to maintain it. But we have not got it. The only thing we have at present is a General Board which must assume the responsibilities of the missing statesmen, the missing National Defense Council and the missing General Staff of the navy. Not only must the General Board determine the probable enemies that our ships may be called upon to fight, but also the kinds and number of ships needed to fight them.

In view of the strange alliances we behold in Europe can anyone longer say, "our most probable enemy," when basing naval estimates? Did anyone expect to see Japan allied with Russia ten years after the close of their own bitter strife? Or England joining hands with France after centuries of enmity? What a remarkable lesson on the fickleness of nations when we find the Russians succoring Englishmen on the Euphrates, while Bulgaria and Turkey fight side by side in Serbia! Do you blame me for using the term "possible enemy" in my definitions, or the General Board advocating the most powerful navy in the world?

We have ever been content to say and think that we need a navy second only to that of England. It is a long step in advance to have our General Board demand a navy second to none. It will take some time to educate our people to this point of view, so long have they been accustomed to believing and hearing that we need a navy "second to England."

Do the English take it for granted that our friendship with them is so strong that it never can be broken? In 1912, Mr. Win-

ston Churchill, First Lord of the Admiralty, introducing the naval estimates to the House of Commons, in the course of his speech, said:

> And it was realized that for the future the fleet which would most powerfully influence British naval policy would be that of Germany. With no unfriendly feeling, but merely in recognition of this new factor in the naval situation, the British authorities had to turn from the Russian fleet in its weakness, and the French fleet already suffering from years of confused naval policy, to the consideration of the rapidly growing navies of Germany and, *in a limited sense, the United States.*[7]

And Hislam says:[8]

> What the object of the United States is in building such a fleet as she now possesses, and further, in being determined to increase it, it is difficult to see. . . . . whatever be its *raison d'être,* however, the fleet is there, *and it cannot be altogether ignored, no matter what may be the comparisons between blood and water.*

Let our marine trade, from any cause whatsoever, begin a growth which would indicate that henceforth it would have to be reckoned with, or that it might assume the position it occupied at the outbreak of the Civil War, and it is not to be doubted that soon we should hear rumblings and grumblings from our friends across the water. England's life depends on the sea. Close the highways of commerce to her in time of war or deprive her of the major portion of the carrying trade in time of peace and she must falter and die. Brine is good for sick nations as well as sick men.

It may be asked what all this has to do with the proper size of battleships. It has everything to do with the question! I intend to show that the question of whether it is proper to build large or small battleships for a certain sum of money cannot be settled on any basis of displacement, speed, gun-power, steaming radius or unit cost, but only on the basis of *what our possible enemies are doing*. In other words, it is incumbent on us always to build more and better ships than anyone else in building.

The General Board determines what shall be the military features embodied in our battleships. The Board of Construction decides how many thousand tons displacement will be required to float all the military features the General Board signifies as

[7] Hurd, Command of the Sea.
[8] Hislam, The Admiralty of the Atlantic.

desirable. It will then serve our purpose if we imagine ourselves on the General Board, confronted with the question of how many and what size battleships to ask Congress to appropriate for. This question must be decided yearly by the Board.

The members of the General Board are not god-like. They are quite the opposite—they are naval officers. Just as we should arrive at the proper decision as to the size of battleships, so do they—by a logical conclusion based on reasoning from history, our national policy, experience as seamen, military experts, scientific knowledge, the decisions of other nations as expressed in their building programs, the wealth of the nation and the amount it can afford to spend on national defense. There is no other way to determine this all important question—no mathematical formulas, no supreme court, no superman. It must be decided by human beings, of whom there are none so qualified as naval officers, on whom the country must depend for expert opinion. Admiral Sir R. Custance, R. N.,[9] expresses the same idea in these words:

> A ship of war embodies the tactical and strategical ideals of the age in which she is designed and built. To examine those ideals, to reject those which are false and to set forth those which are true, together with the military principles underlying them, is the business of the naval officer. To embody those principles in a design is the part of a naval architect. Whence should the naval officer derive his ideals? From a wide and searching inquiry into war in all its aspects, from its human as well as its material side, in past as also in modern times. From this comprehensive study will spring a knowledge of principles without which the imagination is apt to run riot, and the lessons drawn either from isolated actions or from peace experiments are liable to be wrong and misleading.

On the part of our General Board such studies as mentioned in the above quotation lead inevitably to laying down battleships superior to any building by possible enemies. If not, why our *New Mexico* and the new designs to carry ten 16-inch guns, or projected battle cruisers to carry ten 14-inch guns and to maintain a speed of 36 knots?

In 1830, Sir Thomas Hardy, Nelson's flag captain, of whom Nelson said, "I never knew Hardy wrong on any professional subject," became First Sea Lord of England. In regard to his policy as to the size of ships, his biographers write as follows: "He was strongly impressed with the conviction that our naval

[9] Custance, Transactions of the Institute of Naval Architects, 1912.

superiority could only be maintained by large and powerful line-of-battle ships carrying heavy armament, as in action nothing could resist their concentrated fire." [10] By ships of the line Hardy undoubtedly had in mind 120-gun ships like the *Orient*, which signally defeated the *Bellerophon* (74) at the battle of the Nile, or the *Santissama Trinadad* (130) which bore the brunt of the British attack at the battle of St. Vincent without suffering capture or destruction in the Spanish defeat.

The cardinal principle of military strategy is to bring a superior force against an inferior one. This principle endures throughout the ages, because it is based on common sense. Superiority does not necessarily mean superior numbers; it signifies superiority in as many factors as possible bearing upon winning a fight, a campaign, or a war, and may assume the form of superior numbers, guns, speed, protection, strategical or tactical position, matériel, personnel, or simply moral qualities like bravery, gallantry or mental poise. When Nelson said, "Numbers only can annihilate" he must have meant superior numbers as opposed to equal or inferior ships of the enemy. Take the case of the *Révolutionaire* (110) in Lord Howe's battle of May, 1794. She was first engaged by the *Bellerophon* (74) for an hour and a quarter. She was then engaged in succession by two other seventy-fours, but survived all three attacks of ships aggregating just double her gun-fire, coming in succession against her.[11] Of this action Captain Mahan says:

> The concentration upon her though eminently judicious, served to bring out vividly the advantage, which should never be forgotten, of one heavy ship over several smaller, though the force of the latter may, in the aggregate, be much superior.

The same eminent critic in another article [12] makes the following statement:

> Undoubtedly, if all other things, skill, courage, numbers, combinations, fortitude, are the same on both sides, bigness, barring accidents, will carry the day; but when have all other things been the same? We are putting in the foremost place of consideration that which military history shows to be the least of several factors. . . . . Providence is most often on the

[10] Nelson's Hardy, Broadley and Bartelot.

[11] Jane, Heresies of Sea Power.

[12] Mahan, Reflections, Historic and Other, Suggested by the Battle of the Japan Sea, U. S. Naval Institute, June, 1906.

side of men who best know how to manage their battalions, or their ships; the smaller have more often triumphed by their conduct than the bigger by their weight.

The admiral here seems to deal with bigness in the sense of physical size only. No one contends that 32,000 tons of battleship is desirable unless each ton is a ton of fighting strength and the whole is 32,000 tons of military power. Neither is it clear why the officers and men on the big ships cannot have as many military virtues as though they were on small battleships which like wolves would depend upon numbers to give the strength and courage to attack. Not only would the personnel possess as many virtues, but they would hold that one most necessary of all —confidence in themselves and their weapons.

At Coronel the Germans under Von Spee won by virtue of their superiority, in that they had two ships carrying a broadside of four 8.2-inch guns, each, as opposed to the *Good Hope* carrying two 9.2-inch guns; off the Falkland Islands they suffered the same fate that they had inflicted upon Cradock, because their superiority had been lost and the English possessed it in two broadsides of eight 12-inch guns. In the Dogger Bank action, in which the most modern units were engaged, we see unit strength combined with numbers again winning. In the last two actions the weaker side began to run the instant their inferiority was discovered. No effort was made to replace modern long range guns by conduct. And yet when defeated and death was at hand was ever conduct more gallant than that shown by the crews of the *Good Hope,* the *Scharnhorst,* the *Gneisnau* or the *Bleucher,* the *Cressy,* the *Aboukir* or the *Hogue*?

Does the conduct of men in the war now raging suffer by comparison with that of men in former wars? The bravery of men in the face of new and terrible dangers; their endurance when pitted against days, weeks and months of cold and wet: their love of country and forgetfulness of self have never shown forth as they do now. Evidently there are no grounds for fearing, as Mahan does, that the growth of ships in size and power tends to lessen the heroic qualities of men.

Increase in size denotes progress. We live in an age when vast strides are being constantly made in the arts and sciences. Is it any wonder then that they should find immediate expression in

the battleship which is the embodiment of the skill and ingenuity of man? Because the iron worker of 50 years ago used a 10-pound sledge to hammer out his forgings, would one have the iron worker of to-day refuse the use of a trip hammer to perform the same tasks?

That our fathers believed as we do is manifest. Each attempted to gain the advantage by building their galleys and then their ships superior in some way to those possessed by their enemies.

In April, 1816, the President was authorized by Congress to cause to be procured the steam engines and all the imperishable material necessary for building and equipping three steam batteries on the most improved plan and best calculated for the defence of the ports and harbors of the United States.[13]

As self-appointed members of the General Board let us now examine into the cost of ships to determine, if we can, how many small battleships we can build instead of a less number of larger ships. On what are we to base the cost? Shall it be displacement, speed, protection or guns in the main battery? The naval constructor will quote the cost per ton displacement; the engineer will dwell on the machinery weight per I. H. P., or in other words, the machinery installation cost; the man who builds ships for passive defense only, will concern himself with the armor and its cost per ton; what, then, should the admiral who commands on the day of battle take as his basis? Evidently he should consider the pounds of steel he can land per minute within his enemy's armor as the determining factor.

One other point must be kept in mind when cost is under consideration, and that is the cost of maintenance. Sir William White defines a modern warship as, "essentially a mobile gun platform capable of transporting weapons of offense to any desired sphere of action and bringing them into play against an enemy."[14] No exceptions can be taken to this definition, so it is evident that maintenance as well as first cost should be based on gun power. Assuming that the 12-inch 45-caliber, 12-inch 50-caliber, 14-inch 45-caliber and 50-caliber guns all have the same loading interval, and this can be done without any material error since the salvo interval depends more on other factors

[13] Report of the Secretary of the Navy, 1826.

[14] White, The Society of Naval Architects and Marine Engineers, November, 1910.

than the loading interval, and further assuming two 8-inch salvos to one 12-inch salvo, which is all in favor of the ships carrying the 8-inch guns since this caliber will be ineffective except at close, modern battle ranges, we derive the following table:

TABLE I.

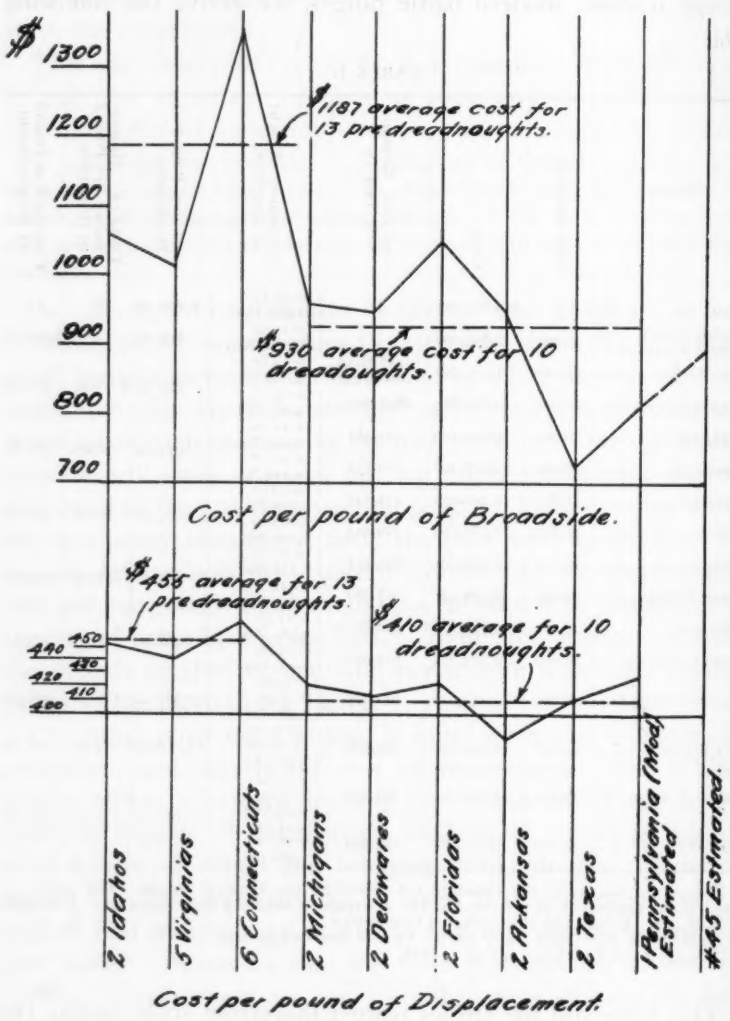
Name.	Displacement.	Cost.	Cost of Commission 1914-15.	Armament Weight of Broadside.	Cost per Pound of Broadside.	Yearly Maintenance per Pound of Broadside.	Cost per Ton Pound of Displacement.
No. 45[1]	?	$18,800,000	?	10–16 in. 21,000 lbs.	$ 895.24	?	?
Pennsylvania (mod.)	32,000	13,695,000	?	12–14 in. 16,800 lbs.	815.00	?	$428.00
New York	27,000	11,219,390	less than one year	10–14 in. 14,000 lbs.	719.47	$ 60.45	410.09
Texas	27,000	10,925,884	8846,305	10–14 in. 14,000 lbs.			
Arkansas	26,000	9,940,309	793,363	12–12 in. 10,440 lbs.	951.04	78.88	381.88
Wyoming	26,000	9,917,466	853,712	12–12 in. 10,440 lbs.			
Florida[2]	21,825	10,242,495	755,533	10–12 in. 8,700 lbs.	1,059.32	85.33	422.27
Utah	21,825	8,189,674	729,223	10–12 in. 8,700 lbs.			
Delaware	20,000	8,069,201	695,921	10–12 in. 8,700 lbs.	953.37	75.50	414.71
North Dakota	20,000	8,579,441	617,780	10–12 in. 8,700 lbs.			
Michigan	16,000	6,795,337	618,807	8–12 in. 6,960 lbs.	968.33	88.31	421.10
South Carolina	16,000	6,683,874	610,648	8–12 in. 6,960 lbs.			
6 Connecticuts[3]	16,000	7,494,010	692,199	4–12 in. 8– 8 in. 5,480 lbs.	1,367.52	126.31	468.39
5 Virginias[3]	14,948	6,600,400	735,603	4–12 in. 12– 8 in. 6,480 lbs.	1,018.58	113.59	441.56
Idaho[3]	13,000	5,894,961	663,376	4–12 in. 8– 8 in. 5,480 lbs.	1,070.05	132.15	451.08
Mississippi[3]	13,000	5,832,801	685,004	4–12 in. 8– 8 in. 5,480 lbs.			

[1] The cost of No. 45 is the estimate submitted by the General Board. The battery is based on the statement, as reported by the newspapers, made by Rear Admiral C. J. Badger, U. S. N., ret., before the House Naval Committee.
[2] Built by the New York Navy Yard. Cost is abnormally high.
[3] Two salvos of 8-inch for one of 12-inch.

This table and the curves plotted therefrom show clearly two important facts, viz:

(a) The change from a mixed battery to a one caliber battery has resulted in an average decrease of 21.65% in the cost of battleships per pound of broadside.

(b) The average cost per pound of displacement of ships carrying one caliber batteries has been 9.89% less than those carrying mixed batteries.



Leaving out the *Pennsylvania* (modified) and dealing with ships in service, an examination of columns (6) and (7) shows that in building battleships, as in other forms of business, the overhead charges are reduced when the size of the output (weight

of broadside) is increased. Taking into consideration the average cost of ships in a class we derive the cost of the emplacement of a 12-inch gun on a *Michigan* as $842,451; on a *Delaware* as $832,432; and on a *Wyoming* as $810,741. The actual cost of the installation is thus seen to decrease as the number of units installed increase. What is much more to the point is the kind of emplacements we have provided for our guns in each case! No one can dispute that as the size of the ships increase so proportionately increase all those military features—size of guns, speed, steaming radius, protection, and seaworthiness—which are essential components of the well-balanced ship.

The most interesting examples are the *Idaho* and *Mississippi* in comparison with the *Louisiana* and *Connecticut*. The two former ships are what Jane terms "particularly interesting ships as they put into practice the 'moderate dimensions theory.'" But considering cost only, columns (6) and (7) show that it was more expensive to build and maintain second than first class battleships. The money lost was a small item compared to the military value lost.

That the same conclusions in regard to cost have been realized in the past is shown by numerous writers. Among the deductions stated by Lieutenant Fisher[15] is the following:

> For the same expenditure on building and upkeep, more power can be obtained in larger ships than small.

Lord Brassey, in discussing the Prize Essay,[16] 1878, by Captain Colomb, said:

> It is not proposed to reduce dimensions in order to spend less. We are deficient in the number of ships; and if we spend a smaller sum on each, we can build more for the same money. . . . . A ship which is twice as strong as another, but costs three times as much, should be looked on as the weaker of the two, as an item of naval policy.

The cost table shows clearly that as the military power of battleships decreases the proportionate initial and maintenance costs increase. Another English authority[17] in 1878 wrote:

> We must therefore consider this: take some given sum of money, say £3,000,000, what is the best squadron we can make for three millions of money? It is not too much, because the Italians are investing £2,500,000

[15] Lieutenant F. Fisher, Royal United Service Institution, July, 1909.
[16] Journal of the Royal United Service Institution, 1878.
[17] Idem.

on four ships. It will produce six *Inflexibles* or it will produce 120 *Gammas*. Now which is the most powerful? This question has been answered by the Admiralty; they have had to consider whether they would build six *Inflexibles* or a larger number of slightly smaller ships. Instead of going to 11,000 tons they have taken a displacement of 8500 tons, as in the *Ajax*, costing £350,000, which will give them for £3,000,000, nine ships. We, therefore, have nine *Ajaxes* against six *Inflexibles*. Nine rams and 18 pairs of 38-ton guns against six rams and 12 pairs of 80-ton guns.

The above was written during the heyday of the ram. The worship of this fetish led the English Admiralty into the error of building small ships with small guns instead of putting their trust in heavy guns on fewer ships. In less than 10 years they abandoned the ram for the real weapon, the gun, and the nine *Ajaxes* hence became of less military value than would have six *Inflexibles* with their 80-ton guns. Lord Brassey, in a letter to the *London Times*, 1906, wrote:

Let it be assumed that forty 12-inch guns have been ordered. Shall they be concentrated as in the dreadnought in four ships, or distributed in more ships. It will cost considerably more to build, let us say, six ships as against four. The risks will be more divided. I submit that it is an essential gain and worth the cost.

Let us turn from the consideration of costs, which clearly indicate the advisability of building large ships, to the next point. In taking up this point it is necessary to bear in mind the words "would the defence of our coast, and incidentally aggressive action, be better provided for . . . . ?" Suppose the General Board to be evenly divided on the question of whether to ask for four small or two large battleships. In face of the record of the past 13 years, could the Board do otherwise than ask for the two large ships? Since 1903, the General Board has recommended the construction of 42 battleships and in that time Congress has appropriated for 20. At the same time 315 other vessels have been requested and 153 allowed. In view of this well defined attitude of Congress, would it not be foolish of the General Board to recommend small battleships when the probability amounts almost to a certainty that the allowed number will be one or two each year? If for no other reason, the General Board is thus obliged to ask each year for the most powerful battleships. Did they not, the country would very soon suffer not only from a deficiency in the number deemed necessary for adequate protection, but also in the quality of those possessed. The United States would be

the owner of a fleet of second class battleships instead of one composed of first class ships, as it now is.

On November 27, 1914, Mr. Winston Churchill, the First Sea Lord, in a statement made before the House of Commons enumerated the following named ships that would be added to the active English fleet before the end of 1915:

Name	Displacement	Battery	Speed
1. Agincourt	27,500	14 12-inch	22
2. Erin	23,000	10 13.5-inch	21
3. Tiger	25,000	10 13.5-inch	21
4. Benbow	25,000	10 13.5-inch	21
5. Emperor of India	25,000	10 13.5-inch	21
6. Queen Elizabeth	27,500	8 15-inch	25
7. Warsprite	27,500	8 15-inch	25
8. Valiant	27,500	8 15-inch	25
9. Barham	27,500	8 15-inch	25
10. Resolution	25,750	8 15-inch	21
11. Ramillies	25,750	8 15-inch	21
12. Revenge	25,750	8 15-inch	21
13. Royal Sovereign	25,750	8 15-inch	21
14. Malaya	27,500	8 15-inch	23
15. Almirante Latorre	28,000	10 14-inch	23

Look well at this list! Fifteen capital ships of 394,000 tons displacement and carrying seventy-two 15-inch, forty 13.5-inch, ten 14-inch, and fourteen 12-inch—total 136 guns, all put into commission in 18 months!

Before we can contemplate building more ships than this possible enemy, we must wait until we can at least approach the rate at which she builds. Many will claim we are not building battleships with which to fight England and that it is ridiculous to discuss a building program based on such an hypothesis. *We are not building battleships with which to fight any particular nation!* We sincerely hope all our ships will become obsolete and targets for gun practice without ever firing a shot at an enemy. However, we do not know who our enemies will be, and since we do not, we want to be ready for any. We build battleships for defense, but in defending ourselves we do not contemplate resting inert until attacked. The offensive-defensive appeals to us. "The best way to accomplish all these objects is to find and defeat the hostile fleet or any of its detachments at a

distance from our coast sufficiently great to prevent interruption of our normal course of life." [18]

The last extraordinary budget asked for in England brought up the cost of the war to more than ten thousand four hundred million dollars! The daily expenditure has risen to over twenty-five million dollars! There is as yet no end in sight. Twenty-five million dollars will build two "large" battleships. In other words England is daily spending for war the cost of two capital ships. It is believed that it would be true economy to spend annually between fifty and one hundred million dollars for building ships until we become possessed of a fleet that will absolutely insure us peace. However, it is not within the province of the naval officer, the expert upon whom the country must depend for a right decision as to number and kinds of ships needed, to discuss costs. The expert must give his honest opinion as to what is needed—the people through their representatives in Congress must decide if they want to pay the cost of adequate protection.

An eminent English authority [19] used the following words:

It needs little reflection to conclude that the question as to what is the size proper to a battleship must be differently answered at different times, on account of the intervening advance of invention and manufacture. Again, size, for a particular nation, is affected by what is done elsewhere; and any distinct advance in one country must, in general, be answered in others. It may be, however, that for a nation of *strictly* limited resources, requiring vessels for use in home waters, the best policy is to have such ships somewhat smaller, but mounting a limited number of the heaviest guns. . . . . One of the characteristics to be embodied in a warship at a given period, is that of the number of vessels required to adequately perform the duties devolving on the navy, in home waters and abroad, in peace and war.

Darrieus expresses the same idea more succinctly as follows:

A country ought to have the fleet of its policy.

It is the English policy to have a great number of just such ships as Welch describes, "Somewhat smaller, but mounting a limited number of the heaviest guns." How admirably the 15 enumerated on page 1095 fulfill these conditions! And if England requires this type why not the United States? Because England built during the past 10 years for conflict with a definite enemy—

[18] Report of the General Board, 1915.

[19] Prof. J. J. Welch, Transactions of the Institute of Naval Architects, Pt. I, 1911.

Germany. She built to guard her trade on the seven seas; she built to guard her coasts from the attacks of German fleets and armies based within 300 miles of her harbors; she built to protect her island possessions and colonies which encircle the globe. All these duties her navy is doing to-day with such thoroughness that it commands the admiration of all. To perform these gigantic tasks there are needed a great many ships of all types. According to the newspapers, England has added 1,000,000 tons to the displacement of her navy since the war began. To secure and maintain the safety of the great trade routes upon which England and her allies are so dependent, an absolute clearing away of German ships was necessary. This task called for many cruisers to search out and hunt down the German commerce raiders. In the beginning of the war, these raiders were to be found not only acting singly, but, as occasion offered, they combined to form a squadron for offensive purposes and defeated an English squadron sent to search for them individually. This victory of the Germans was immediately answered by the English dispatching a squadron containing units from the battle fleet which in a short time discovered and sunk the German squadron.

The *Invincible* and the *Inflexible* were exponents of the well recognized rule that commerce or overseas expeditions by virtue of the weakness of their units must be protected by more powerful forces than any enemy will probably bring against them. If the enemy threatens with battleships or battle cruisers then the threat must be answered by a more powerful force of like units. In addition to clearing the seas of all German warships that had escaped to sea at the outbreak of the war, cruisers are maintained off all the important neutral ports to prevent the escape of interned ships and the passage of contraband in neutral bottoms. By sweeping clear the seas of German ships and then by diligently watching all ports from which others might issue. England has kept open the trade routes for herself and her allies. Who can say that to destroy the battle fleet of the enemy is the sole object of a "fleet in being"? Is not a decision in the present war promised more from treasuries than from the battle-fields of Europe? With a blockade constantly becoming more stringent, can the economic conditions within the Central Empires improve? Is not the effect of the blockade already indicated by the greatly

depressed exchange rates on German marks or Austrian kroners? We have before us to-day the most striking example of the effect of one belligerent destroying the trade of the enemy while preserving the integrity of its own. Not only does the absolute blockade fix the state of trade, but in military matters it likewise has the greatest weight. England by means of her blockade and freedom from fear in regard to German attack on the water, can transport in almost certain safety millions of troops and countless tons of stores and military supplies across the Channel, to and from distant colonies, the Dardanelles, or Salonica. At the same time a powerful battle fleet has been constantly maintained at such a base that it is centrally located with respect to the different routes by which the German fleet may come forth. This base, as foreseen before the outbreak of the war, is close to the source of supplies and coal, and since the primary object of building the battleships is to fight an enemy some place in the North Sea or contiguous waters, it follows that the amount of coal and stores to be carried are small in comparison to those carried by ships acting far from their bases.

Not only was the English battle fleet built to fight in the shallow waters of the North Sea and possibly the Baltic, but also, if necessary, to engage the enemy in the shoal waters of Heligoland bight and similar estuaries. All these reasons make desirable ships of moderate draught, bunker and store-room capacity, while the multitudinous duties to be performed requires a very large number of ships. A very large number of capital ships of moderate dimensions, but each carrying a heavy battery is thus seen to be the type best adapted to England's needs.

It is evident, then, that the moderate size ships are not built because a limited number of guns on a ship is thought best, but conversely the moderate size ships considered as best fulfilling the military requirements, can carry only a limited number of heavy guns.

The United States should build for quite different reasons. In the first place the truth enunciated by the General Board should be borne in mind and plans made to wage any war in which we may become engaged in the waters of the enemy, instead of sitting passive and allowing the conflict to be carried to our own coasts. In other words we must prepare to take the initiative. Since

wars are becoming more and more a matter of dollars, that nation which can maintain to the greater extent her normal life and foreign trade, will, other things being equal, win the contest. The first requirement in maintaining normal the life of the people in time of war is to keep the conflict at a distance from them. This cannot be accomplished except by assuming the initiative and carrying the war into the enemy's country instead of allowing him to inflict our people with the turmoil of battle. Only by keeping undisturbed the mass of the people can business and manufacturing be maintained normal, and the export of manufactured articles continue. Without revenue from outside the limits of the country, which revenue is only to be gained by selling raw material and manufactured articles, no country can exist for a great length of time.

A large part of the successful conduct of a war lies in the control of the sea borne trade of both parties to the contest. To control the trade of the enemy we must be prepared to attack it where Corbett[20] shows it its most easily defended—at the source and destination. The points at which the routes of exports and imports converge will be determined by geographical features, but as a rule they will lie close to the enemy's coast. To attack the enemy's trade will therefore require a battle fleet which will, by its preponderance in power, either drive the enemy's fleet into his harbors, or defeat it in battle. The United States have no outlying naval bases. The battle fleet must then be based on distant points, a condition which requires long lines of communication exposed to the threats and attacks of the enemy. To make the battleships as self-sustaining as possible by reducing the frequency with which they must be re-fueled and provisioned and to enable them to carry a maximum amount of ammunition so that they will not be found impotent after an action, size is required. Small battleships demand naval bases to support them. In this respect the United States are absolutely lacking. We possess numerous ideal forts, strategically situated, in which to create powerful bases for our battle fleet, but, to date, advantage has not been taken of our opportunities.

How different is the case of England! Pick out any first class power and somewhere close at hand will be found an English

[20] Corbett, Some Principles of Maritime Strategy.

naval base. The long series of abortive efforts to invade England made by France and other European powers show conclusively that so long as the battle fleet of a nation remains undefeated and unconfined, a successful invasion of that country is impossible. Not only must the convoy of transports and storeships be protected during the initial passage, but also as long as the armies continue in the invaded country. Attacking ships must therefore be kept at a distance from the transports which would fall victims to the weakest warships. To keep the attacking force at a distance from the transports there is required a guard stronger than the force that can be brought against it. This guard does not necessarily have to be in company of the convoy, but wherever it is it must be able to interpose its force between the convoy and an attacking force. The strength of this guard will be based upon that of the probable attacking force. The helplessness of transports and the train demanded by an overseas expedition is so great that until the sea is clear of the battle fleet of the enemy and a very large degree of immunity from attack is enjoyed, such an expedition cannot be undertaken.

It is for these reasons that an attack in force on our coasts is not to be feared until after our battle fleet has been defeated or compelled by superior forces to withdraw from the disputed area. To prevent such a crisis our battleships should be superior in force to an equal number of the enemy and this result cannot be assured unless, ship for ship, we build our battleships superior in power to those built at the same time by a possible enemy.

Let us now turn to the question of guns. It has ever been a cardinal principle of American naval officers to install aboard our ships batteries that would give a superiority in weight of broadside over an enemy of equal displacement. To this principle many victories are directly attributable. Shall we in these modern days when the range has increased from 900 yards to nine miles, depart from this principle? Assuredly not! The *raison d'être* of the battleship is to carry guns. That the standard for guns is constantly changing is evident when one considers the statements made by authorities in the past.

Not to go too far back we will take as our starting point the Spanish-American war. A board of survey ordered to report on the wrecks of the Spanish cruisers destroyed July 4, 1898, re-

ported, among other things, (a) "No torpedoes should be carried in fighting vessels," (b) "Rapid fire batteries in battleships are of supreme importance." As a result of these conclusions, no torpedo tubes were installed in the *Kentucky*, *Alabama*, *Illinois* and *Wisconsin* and our building for the next five years consisted largely of cruisers with weak batteries.

Rear Admiral Mahan[21] advocated the installation of three 6-inch guns in place of one 12-inch. Misled by the account of Semenoff and others who dwelt upon the damage done to the crews and the upper works of the Russian ships at Tsushima by a large number of 6-inch shells and doubtless unaware of the great change that had taken place since 1900 in the methods adopted to obtain a very great increase in the accuracy of pointing and the rapidity of gun fire, the admiral, together with eminent English, French and American writers, advocated mixed batteries—a few 12-inch guns to sink the ship—a large number of smaller guns to destroy the crew. As late as 1910, Sir William White[22] placed himself on record with these words:

> The writer desires to place on record his personal opinion that in no case is it desirable to carry more than eight heavy guns in a single ship; that these guns are best arranged in four positions as in the *Michigan* class, and that they should be supplemented by a powerful and well-protected secondary armament.

Meanwhile, Captain Percy Scott, R. N., had developed some new ideas and methods of his own. These proved so successful that their effect was immediately seen in the *Dreadnought*, the first ship to carry a main battery of ten 12-inch guns emplaced in five turrets. In spite of the advocates of mixed batteries, the A. B. G. B. S. school was soon in the ascendency and so logical were the arguments upon which was based the change from a mixed to a heavy one caliber battery for offense that within five years the former system had been abandoned by all the nations. Even before the plans of the *Dreadnought* had become public, those of the *Michigan* and the *South Carolina*, each carrying eight 12-inch guns on a displacement of 16,000 tons had been drawn by our designers.

[21] Mahan, U. S. Naval Institute, June, 1906.

[22] Sir William White, The Society of Naval Architects and Marine Engineers, November, 1910.

No officer who has ever been responsible for the fire control of a pre-dreadnought with its battery of four 12-inch, eight 8-inch and numerous 6-inch guns, each caliber demanding separate control with the accompanying complication of personnel, matériel and information required, no one, it is repeated, who has ever been a member of such a fire control party can fail to appreciate the simplicity and ease with which a one caliber battery can be more efficiently controlled.

It seems remarkable, indeed, that the English should have laid down the *Dreadnought* the same year that the Russo-Japanese war ended. To the Japanese the lesson of the battle of Tsushima was the value of a large number of guns of intermediate caliber, as manifested by the batteries of the *Kurama, Satsuma* and *Aki* which were laid down in 1905 and 1906. At this time English naval officers were presumed to have access to more definite Japanese information than anyone else, yet just as the Japanese decided a large number of intermediate caliber guns are desirable, England builds the first dreadnought. What was the reason? Just as it is extremely doubtful that the Japanese divulged all their information to the English, so is it to be doubted whether the English had impressed on the Japanese naval officers the value of the new ideas in training gun crews and controlling gun fire in action. A bold step was needed, also, to gain an added lead on Germany. The unheralded appearance of the *Dreadnought* with her turbine driven engines developing a speed of 21 knots, her battery of ten 12-inch guns and her superior protection immediately cast into the second class all ships previously built. The race between England and Germany took a fresh start with England well in the lead.

The change in battery was not made, however, without protests from many naval officers and designers of note such as Mahan in this country, as previously noted, Custance,[22] "Barfleur"[24] and Hovgaard.[25] The latter expressed himself as follows:

> I sounded a warning against a too rapid increase in the displacement of battleships and pointed out the drawbacks connected with excessive size. Not till all the technical means of improvement at our disposal have been

[22] Custance, The Ship of the Line in Battle.

[24] "Barfleur," Naval Policy.

[25] Hovgaard, Transactions of the Society of Naval Architects and Marine Engineers, 1906.

exhausted should we resort to an increase in displacement, and then only in a conservative manner, so as to make the ships match the battleships of other nations, or, if thought necessary, surpass them to a certain extent. Upon these general conclusions and under existing conditions, I recommend building battleships of about 18,000 tons displacement (*i. e.*, 2000 tons more than any battleship so far laid down in this country), of 19 knots speed and with a principal armament of a combination of 12-inch with 9- or 10-inch guns.

Hovgaard further recommended using turbines, liquid fuel for mixed combustion and small tube boilers to decrease the machinery installation. By so doing he stated that it was possible to produce a ship of about 18,000 tons displacement and 19 knots speed that would be superior to the *Dreadnought* in armor and armament. On the other hand Mr. Winston Churchill, First Lord of the Admiralty, in his remarks to the House of Commons on March 18, 1912, said, referring to the Russo-Japanese war:

> The war also illustrated in particular that the decisive factor in a naval engagement was not, as had been supposed, the secondary armament of battleships, the 6-inch guns, but the primary armament of heavier weapons, 12-inch and larger guns.[20]

The increase in the size of guns has followed logically from improved mechanical devices and a better understanding of the art of gun construction. Coincident with these advances have been vast strides in the perfection of gunpowder on the one hand and armor on the other. Our ability to build a 50-caliber 14-inch gun with such longitudinal strength that it suffers little or no droop of the muzzle follows not only from a better understanding of gun construction, but also from the advancement made in steel manufacture and the turning out of large, heavy forgings composed of metal without flaws. This advance from a 35-caliber to a 50-caliber gun would, however, be of no avail had not the advance in the manufacture of smokeless powder kept pace with that of steel. To-day we can construct with greater accuracy and less liability of error a 50-caliber 14-inch gun than 10 years ago could be built a 40-caliber 12-inch gun. On the other hand the same advance in the art of steel making that provides better guns, gives also much better armor and projectiles. In addition to the gains in the ballistic properties of large guns are added corresponding improvements in sights and their mounts, gun mounts,

[20] Hurd, The Command of the Sea.

the delicate control of the guns both in train and elevation, the supply of ammunition, the rapidity of loading, and the protection of the guns' crews.

All these advances would be wasted, however, were it not for the invention of the gyroscopic compass and its incorporation in the range finding installation; the growth of range finders from one to eight meters with their ready means of adjustment, automatic transfer of the range to desired points, and a higher degree of workmanship. The result of all these improvements, or rather the object of them, is to enable guns to hit at longer ranges and more often. The whole object is expressed in "hits per gun per minute." That ship which can hit her enemy first and then more often and with more destructive projectiles than she is hit in the same time is bound to win, other things being equal.

The 12- and 14-inch 50-caliber guns are already actualities. The 15-inch 45-caliber gun is in service abroad. There seems no reason to suppose we cannot make a successful 50-caliber 16-inch gun inasmuch as a 16-inch 45-caliber test gun was built and proved several years ago. One of the most startling points brought out by the above comparison is the small gain in danger space made by increasing the caliber of the gun and the weight of the shell. One of the favorite arguments in favor of increasing the size of guns is thereby destroyed, but if we look at the penetration of armor, we immediately see the strongest argument in favor of the heavy gun. At 17,000 yards, the range at which Vice Admiral Beatty reports hits were made by the English battle cruisers in the Dogger Bank action, the 12-inch projectile would penetrate 11.2 inches of armor upon fair impact. It would therefore fail at that range to pierce the main belt armor or turret face plates of any English battleships of the *Orion* or later classes; any German battleships of the *Kaiser* and following ships; any Japanese battleship built subsequent to the *Aki* (1905). On the other hand the 50-caliber 16-inch gun could pierce the main armor belt or turret face plate of any English ship built to date and, so far as known, any battleship built or building.

To provide for future development in guns and thus avoid the possibility of having our ships become obsolete in that respect before a normal lapse of time, and also to retain that superiority in gun fire which has ever been found advantageous

and which, as has been said, is one of the cardinal principles of of the navy of the United States, the installation of the 16-inch gun capable of piercing 16.2 inches of armor at a range of 18,000 yards, nine sea miles, is deemed advisable. The 16-inch gun is considered necessary because it can be served as rapidly as guns of less caliber; its danger space is greater than that of the 14-inch gun. The destructive effects of the shell exploding inside the armor of a ship should be at least 1½ times as great as that of the 14-inch shell.

Considered defensively a most powerful argument for increasing the caliber and thereby the range of the guns of the main battery of a battleship, lies in the vastly increased range and accuracy of torpedoes. Examination of the effective ranges of the latest types of torpedoes against enemy ships of high speeds shows that already these ranges have increased, under certain conditions, to the practicable limits of gun fire. In view of the recent rapid advances made in the ranges of torpedoes can a limit thereto be set? Has not the effective range of the gun got to be increased to such a point that ships of high speed but light armor protection cannot assume favorable positions for launching salvos of torpedoes against our battle formation?

The need of battle cruisers to prevent the same type from attacking with torpedoes, is apparent. If the enemy brings battle cruisers into the action, we must have them also, otherwise our battleships will not be free to hold their course to preserve the maximum gun efficiency. Again we see that we must have the same types of ships as the enemy, but with the units of each type better than any he can bring into the fight.

For the foregoing reasons a main battery of at least ten 16-inch guns is considered necessary. Battleships are deficient in one factor of offensive power in that they possess limited speed. This deficiency must be more than compensated for in some other offensive factor and that factor must be the battery. Both in the size and number of guns must this preponderance be gained over faster ships, and since there are now battle cruisers of 33 knots, carrying eight 15-inch guns, our battleships should carry ten or more 16-inch guns. With such an advantage in offense combined with superior defense in armor, the battleship will have nothing to fear from the high speed battle cruiser. In addition

to the main battery, ample torpedo defense and anti-aircraft batteries are absolutely necessary.

Insofar as protection is concerned, it is a universally accepted axiom that guns must be protected from similar guns. Since the entire ship constitutes the gun platform, it follows that the stability of the ship must be protected against guns equal to those of the main battery. Not only must the stability of the battleship of to-day be protected against gun fire, but it also must be defended against torpedoes and mines below water as well as bombs from aircraft above water. The defense against torpedo and mine attack calls for more extended and minute cellular construction, together with longitudinal bulkheads, coal or liquid fuel so stored as to protect the integrity of the ship, and any new devices like torpedo flexible bulkheads.

The torpedo requires a large ship to withstand it. Rear Admiral R. H. S. Bacon, R. N., in his article [27] on "The Battleship of the Future" says:

> Is a large or small ship more liable to be lost by a torpedo? Constructionally, there seems no doubt that the larger the ship the more likely is it to survive the blow of a torpedo. Provided the number is kept constant, although their size increase no danger from torpedoes accrues to the nation by building larger ships. In building the small ship, speed, size of gun, and power of each hit are sacrificed. Moreover the length of the battle line is considerably increased.

The threat from overhead demands heavier protective decks and more of them. All of these improvements require increased displacement upon which to float them.

As to speed, a uniform speed of 21.5 knots should be maintained. Change of speed more than anything else causes ships to become obsolete before their time. Just so long as they can keep up with the battle fleet, they are not obsolete. Given good guns each can do something in the fight. It is generally conceded that a slight advantage in speed is of strategical value to a commander-in-chief opposed by an enemy as able, resolute and resourceful as himself. To quote Rear Admiral Schroeder: [28]

> The victory was won by the faster fleet, but that does not necessarily carry the conclusion that speed was a determining factor; as a matter of fact a close study fails to reveal any material damage properly attributable

[27] Transactions of the Institute of Naval Architects, 1910.

[28] Gleanings from the Sea of Japan, U. S. Naval Institute, March, 1906.

to it from the moment that tactical contact was established until the Russian fleet was shattered and its remnants seeking refuge in flight.

Again in the same article with reference to speed, he says:

But the frequent and attractive expression that one fleet can thus choose the fighting range does not represent a wholly safe presumption. The faster fleet can avoid action *ab initio*, and can always bring on close action; but if the other resolutely opposes the choice, it cannot maintain a long range without continually heading off, and that is attended by several grave considerations.

In reference to gaining speed in capital ships by the sacrifice of other qualities "Barfleur"[29] speaks thus:

In tactics it (speed)[30] is less important than tactical skill, and it gives a very limited control over the range. In strategy it is discounted by the demands of enduring mobility, by the conditions of war, and by the strategical ability of the admiral. In all cases its uncertainty is such that reliance cannot be placed upon it.

Again quoting Sir Reginald Custance:[31]

For very small squadrons the speed ratio might possibly reach 4 to 3, but the curvature would be immaterial in their case. For fleets of any size the ratio will be perhaps 9 to 8 or more probably unity, which means that for present day ranges, speeds and differences, the courses may be taken as straight, and the permissible number of ships in a fleet unlimited by this consideration.

Nevertheless, if 10% superiority of speed over any possible enemy could be obtained without the sacrifice of some other military quality, that extra speed would be a desirable asset to a commander-in-chief. In other words no admiral would refuse more speed simply because it was speed, but such additional speed cannot be obtained even in a small degree without a heavy increase in the cost or decrease in the battery power, protection, steaming radius or habitability of ships. The price paid in armor and armament for a gain in speed is clearly shown in the following table:[32]

Type Ship	Speed	Displacement	Hull, Equipment, Machinery, Fuel	Armor and Armament	Per cent
1	21	30,000	17,155	12,845	42.8
2	23	30,000	18,180	11,820	39.4
3	25	30,000	19,540	10,460	34.9
4	27	30,000	20,930	9,070	30.2

[29] "Barfleur," Naval Policy.
[30] Inserted by the author.
[31] Custance, The Ship of the Line in Battle.
[32] T. G. Ownes, Battleship Design, Engineering, April 3, 1914.

The increase of 6 knots in the speed would be obtained by a loss of 30% in the armor and armament.

The modern long range torpedo is the most potent factor in favor of high speed. The superiority in speed is needed to gain positions from which to launch the torpedoes against the enemy as well as to evade attacks by the same weapon.

Increase of speed above the adopted standard, about 21.5 knots, is not worth the price. On the other hand decrease of speed cannot be considered because a ship to be effective in the battle fleet in time of war must be able to maintain her station in the fleet formation. Any battleship that cannot take her place in the first battle line is a second class battleship. Therefore the size of battleships cannot be reduced at the cost of speed.

Referring to Table I, page 1091, we note that for ships of the same speed, seven *Wyomings* can be built for five modified *Pennsylvanias*. As self-constituted members of the General Board, we must now decide from a tactical point of view whether we want to build seven small ships to take into action against five very powerful ones. Seven *Wyomings* will carry eighty-four 12-inch guns with a weight of broadside of 73,080 pounds; five modified *Pennsylvanias* will carry sixty 14-inch guns, weight of broadside 84,000 pounds. As the 14-inch and 12-inch guns will have the same firing interval, the relative efficiencies will be 84 to 73 in favor of the 14-inch battery, a gain of 13.6%, in so far as the weight of broadside is concerned. On the other hand there will be fired in a given time 1.4 as many 12-inch shells as there are 14-inch shells. This would give a probability of hitting of seven to five in favor of the 12-inch battery. If the 14-inch and the 12-inch shells had equal penetrative power and equal destructive effects, we would certainly want the eighty-four 12-inch guns. They have no such equality in destructiveness! As a matter of fact the 12-inch shells will not pierce the vitals of a modified *Pennsylvania*, until the range is reduced to 12,000 yards, by which time the *Pennsylvanias* will have had the *Wyomings* within effective range from somewhere outside of 18,000 yards. The majority of the hits made by the *Pennsylvanias* should pierce the side armor, barbettes or turret face plates and explode within the ship or her turrets. Each shell so exploding would hurl 1400 pounds of steel fragments under the impulse of its bursting charge.

In the Dogger Bank action the feed tanks of the *Lion* were pierced by a piece of armor or heavy splinter that had been driven downwards by a shell that had entered the vessel. This one shell put the *Lion* out of action!

Imagine the devastation wrought by a 16-inch shell which is capable of piercing to the very vitals of a ship! Some will contend that the probability of hitting at ranges beyond 12,000 or 14,000 yards is so small that a commander-in-chief would not be justified in consuming his ammunition at those ranges. Right here lies one of the most virgin fields in which our naval officers have an opportunity to work. The steady increase of effective ranges is indicative of the fact that the limit has not yet been reached. The further application of science to firing guns is clearly apparent. The perfect ballistic properties of our powder, the greatly improved shells, a better understanding of erosion and its ballistic effects, a constantly increasing accuracy of range-finder ranges, the ability to compute the ballistic correction after the course, speed and predicted range of the enemy is known, all justify the belief that it is possible to hit and to hit often at ranges hitherto considered excessive.

Although the material damage done by hits at long ranges will be sufficient to justify firing, the moral effect on the enemy will be equally as great. An enemy approaching to engage at 12,000 yards will be badly handicapped if he finds himself being hit at ranges of 16,000 to 18,000 yards. His whole scheme of battle will suffer. How much more, then, will he be at a disadvantage, if, with our first ranging shot we hit him with a 16-inch shell, and 30 seconds later straddle him with a salvo! Think of the enthusiasm and high hopes aroused throughout our own ship when, at the end of 25 seconds of suspense after hearing the first shot fired, word comes, "A hit!" The battle would be half won! Trial trip records would be broken and gun loading intervals halved!

The principle objection made to firing at long ranges is wasting ammunition, so that when decisive ranges are reached there will not be left a sufficient number of rounds per gun to destroy the enemy. This argument is all right for those who do not believe they can hit at long ranges, but it is believed possible to hit. Large ships make it possible to carry a greater number of rounds of ammunition per gun so that the firing at long ranges would be right for the large ship when it would not for the small.

Equal speed having been one of the premises, the seven *Wyomings* are no more able to close in than the five *Pennsylvanias* to open out. Let them find themselves under the guns of the *Pennsylvanias* on an average day when the target can be clearly seen up to 18,000 yards and there is little doubt but that the weaker ships would be badly damaged before they had arrived at their decisive range. If seven *Wyomings* should suddenly run out of a fog and find themselves within 12,000 yards of five modified *Pennsylvanias,* they could doubtless overcome them; but is it not unreasonable to suppose such an extreme case? Not all believe thus, however, for Vice Admiral Gervais, one of the best naval officers of his day and one of the finest tacticians of the French navy, has long maintained that one strong and fast battleship would certainly be a match for two, or possibly three, weaker vessels. Battleships are not supposed to travel alone in time of war and it is not worth while to build ships that must depend on fog or other accident to enable them to defeat the enemy.

Having built any multiple of seven *Wyomings,* what assurance can be given that in time of war they will always find themselves in the presence of the enemy with a numerical superiority of seven to five? However, assuming that the ratio has been preserved and two squadrons find themselves in tactical contact, what will be the result? Let us first examine the case from the battery point of view.

Concentration is the first principle of tactics. The battle line that can show more and heavier guns to the mile is the superior tactically. On the flanks, the line containing the greater number of units would possess an advantage over the short line *only after the range has been closed* to the effective range of the weaker units. As the weaker units possess no advantage in speed, they cannot close to their decisive range except at the will or by the errors of the stronger. If allowed to close to the decisive range of the weaker gun, the ships carrying them must pass through a zone several thousand yards wide in which they will be exposed to the effective fire of the enemy while their fire is relatively ineffective. This zone can be crossed *only at the rate allowed by the enemy.*

Although the premise of equal speed for the seven *Wyomings* as against the five *Pennsylvanias* has been adopted, there are some other factors that must not be lost sight of. The size of a

ship cannot be changed in one dimension only. If the size be reduced on account of carrying a less battery in either number or size of guns, then some other factor must be reduced with it. The speed can be kept the same, but the protection will then be reduced and this is the usual condition in battleships. Not only the protection against gun fire, but also that against mines, torpedoes and aeroplanes will be reduced.

In producing the *Idaho* on 3000 tons less displacement than the *Connecticut,* two knots speed, considerable armor in both thickness and area, and even more of the effectiveness as gun platforms and habitability were sacrificed. In saving 2000 tons by building *Michigans* instead of *Delawares* the following losses in power were accepted—two knots speed, two 12-inch guns, and especially gun platform value and steaming radius. Only one conclusion can be reached, viz.: a numerical superiority of ships carrying comparatively weak batteries and protection without superiority of speed, is useless. "Speed, tactically, is a useful complement of, but can never be a substitute for armament."[33]

The following data is indicative of the gain in offensive and defensive power made by increasing the size of the ship:

	Displacement	St. Eng.	Per cent	Ordnance	Per cent
Michigan	16,000	1584	9.9	4,956	31
Delaware	20,000	2035	10.2	6,622	33.1
Pennsylvania	31,400	2300	7.2	11,060	35.3

Ordnance alone contains only a part of the offensive and defensive powers of a ship. In addition to the great increase in the proportion of the ship's displacement given over to ordnance in the large ship, gains in military power are made in seaworthiness, habitability with its direct effect on the efficiency of the personnel through their health in body and mind, protection against torpedoes and mines in the construction of the ship, protection against aeroplane attacks.

Since the cost of ships increases slower than the increase in battery power, it follows that everything else being equal, a given number of guns of the same caliber can be cheapest carried in large ships. To carry for the same price a certain number of guns on a large number of small ships instead of a small number of large ships, therefore necessitates the sacrifice of some military power—protection, speed, steaming radius or seaworthiness on the part of the small ships.

[33] Dewar, United Service Magazine, 1907.

Tactically, the short line composed of powerful units is more easily handled than the long one of smaller ships. The commander-in-chief can keep under his immediate control a stronger force; signals can be made in less time; maneuvers can be more readily performed—the whole force gains in elasticity and coordination. To quote another English writer:[34]

> A great cause of the increased size of ships is the necessity of having as much gun power as possible in a limited length of line. We have seen that a long line of ships becomes unwieldy, and in practice the number that can be conveniently handled is limited, say to 12 ships. These ships must carry as large a number of offensive weapons as possible, which leads to big ships. . . . . *If*[35] for the same original cost and cost of upkeep, two ships could be built of the same defensive powers and speed as one big one, but each with one-half the offensive power, they would have a considerable advantage in fighting the big ship, as they could obtain concentration of their fire whilst forcing dispersion of that of the enemy. If the length of the line were not limited, we should doubtless see a larger number of smaller ships for this reason.

Before finally deciding between large and small ships on which to spend a given amount for the defense of the country, let us consider the question from the view point of seamen. Little time need be spent in weighing the relative nautical qualities of the large as compared to those of the small ship. The sea speed, that is, the proportionate part of the maximum speed in smooth water, that the large ship can make is the greater; therefore, both the strategical and tactical values of the large ship's speed exceed that of the small ship, and the propulsion of the large ship is more economical than that of the small, because the seas have less retarding effect on it. Modern speeds in a seaway cause a great amount of spray. The high bows necessary to keep a ship dry forward under such conditions call for size. The avoidance of flying spray forward is absolutely necessary to keep clear the sights of the forward turrets, the conning tower and the fire control tower. To avoid spray and the interference of a clear view of an enemy at a distance, it is necessary for the gun turrets to have higher elevation than can be afforded by ships of low freeboard—these reasons likewise call for size.

To be able to fight the torpedo defense battery in any moderate seaway demands more freeboard than the small ship furnishes.

Our battleships must be able to take and keep the sea in all

[34] Domvile, Royal United Service Institution, 1907.

[35] Italics are the author's.

seasons and for long periods. These qualities demand fuel supply, numerous, commodious store rooms and reserve feed water tanks besides sufficient evaporator and distillery plants. Each item demands space and weight which in turn calls for added size and displacement to accommodate and float them. Finally, to afford the officers and crew living space to house them comfortably that their military efficiency will not be lessened by ill-health and discontent requires large ships. It is believed that one of the most potent reasons for the great increase in the percentage of re-enlistments is directly due to the added comforts that the men are finding on our new large battleships. How different is going to sea on one of our latest battleships to the green seas on the forecastle and quarter-deck of the *Missouri* in a moderate sea; to the ever-leaking gun ports of the *Louisiana*; the cramped quarters both above and below decks on the *Idaho*; the pitching and rolling of the *Michigan*.

A favorite argument against large battleships is the question of restriction of movements due both to draught and unwieldiness. It is perfectly true that the large ships will not be as free to enter ports as are the smaller old ships. This fact has a bearing on the question, but examination shows that as the ships demand deeper water, it is made to accommodate them. The Kaiser Wilhelm canal is one of the best recent examples of this point. On our own coast we see constant deepening of channels going on. Boston, New York, and Hampton Roads all now contain channels that will take our battleships for some time to come. The progress in shipbuilding carries with it increased channel depths to float the ships.

The limit placed on the size of battleships for the United States is at present defined more by the depth of water over the sills of our drydocks and the size of the locks in the Panama Canal than by anything else. It would mean tremendous additional expense to build our ships to draw more than 30 feet or to demand a breadth of lock of more than 110 feet. However, if other nations began to build ships that exceeded these limits, there is no doubt but what we would build them also and provide the facilities for handling them.

The days of flying moors with the sparks darting from the hawse pipes, the chains clattering over the decks and the ship throbbing from the backing engines are already things of the

past. Battleships of to-day cannot be stopped in their length as of old. However, the added unwieldiness of the new large ships does not prevent them from going in formation *at higher speeds than heretofore* when at sea. Battleships cannot be built to make them handy harbor ships. There is always plenty of time when coming to anchor in port; it is at sea with an enemy unable to fire his battery on account of the high waves or attempting to escape an action or capture, that the large battleship comes into its own.

In 1908, before the Senate Naval Committee, Rear Admiral Capps testifying in regard to criticisms on our battleships by Reuterdahl in *McClure's Magazine*, made the following statement:

Every battleship is a compromise. If you have excessive armor protection, you have to take weight from some other feature. If you have excessive speed, you must be content with diminished armor or armament. If you have excessive gun power, the extra weight must be taken from machinery or armor or some other essential element. The ship designers and the sea-going officers of different countries may reach different conclusions as to the best final compromise, but concerning the most important features of design they are in accord.

The General Board having decided upon the military features desirable in ships to be laid down, the next step is to call on the Bureau of Ordnance for an estimate of the weight required for the armament and its ammunition; upon the Bureau of Navigation for the complement of men and officers necessary; upon the Bureau of Steam Engineering for an estimate on the weight of machinery to give the desired speed; upon the Bureaus of Supplies and Accounts and Medicine and Surgery for the weight of stores under their cognizance that would be required for the complement for a given period. All these estimated weights are then furnished the Bureau of Construction and Repair which proceeds to make sketch plans of types of ships that would fulfill the requirements.

A former chief constructor[36] of the navy stated the constructor's task as follows:

The problem of the naval architect should be to produce the best military unit for the least amount of money, and it remains for those who command naval vessels to say what limit of military power shall be placed upon the individual unit of the fleet. A distinguished foreigner once asked why our battleships are so large, or of so great displacement, and was told in

[36] Bowles, Society of Naval Architects and Marine Engineers, November 21, 1902.

answer that the conditions of our service seemed to make it necessary for our battleships to go anywhere and be ready to fight when they get there!

The standard of size is a variable quantity. It increases from year to year, keeping pace with the growth of the knowledge and skill of men. Just so long as progress is maintained in the arts and sciences just that long will ships continue to grow. The growth will not always be in size, but it always will be in power. Neeser[37] says:

The advent of the automobile torpedo, threatened the battleship's supremacy as queen of the seas; yet the battleship did not disappear. It held its own, emerging greater and more powerful. It will be remembered that France, under the spell of this marvelous weapon, feverishly built torpedo craft for a number of years and neglected her battle fleet. Like all such radical movements, conceived under the impulse of hysteria, the pendulum swung too far. France, believing that her logical enemy was England or Germany, thought that with countless torpedo craft she could sweep the seas. But it was soon shown by less impulsive thinkers that the mastery of the sea was impossible without those great vessels armed with large caliber turret guns and France was obliged to again take up her interrupted battleship construction program. . . . .

The future mistress of the ocean will likewise be a vessel in which there can be placed the utmost confidence. She must, therefore, be a thoroughly trustworthy type, capable of keeping the sea in all weathers. She must be habitable for a large crew and be armed with the most powerful weapons. She must be able to take the offensive and defensive against any possible opponent. She must be swift, active and dependable and must be able, with the aid of her auxiliaries, to control the entire area through which she will have to operate.

In his Esprit des Lois, Montesquieu says:

The nature of defensive warfare is discouraging; it gives to the enemy the advantage of the courage and energy of the attack; it would be better to risk something by an offensive war than to depress minds by keeping them in suspense.

This is the state of mind which the personnel of a navy of small ships would eventually develop. Dependent always on numbers, the first thought of the leaders would be to look for help. On the other hand the leaders of a navy consisting of a fleet of battleships more powerful than any possessed by the enemy, and with all other types of vessels of such numbers and strength as to form a well balanced whole, the leaders of such a navy would be possessed of that confidence in selves and tools that they would instinctively assume the part of the offensive after war

[37] Neeser, Our Navy and the Next War.

had begun. "Fortunate the soldier" says a great German general, "to whom destiny assigns the rôle of assailant." "The best way," says the General Board, "to accomplish all these objects is to find and defeat the hostile fleet or any of its detachments at a distance from our coast sufficiently great to prevent interruption of our normal course of life."

For a given sum of money we want to build large battleships, *i. e.*, battleships more powerful than those building by any other nation, for the following reasons:

(a) The first cost and the maintenance per unit of military power vary inversely as the size of the battleship.

(b) Both tactically and strategically the large battleships are superior.

(c) Large ships engender the most desirable virtues in the officers and men who conceive and man them.

(d) The national policy demands large battleships.

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AEROPLANE ACCIDENTS: CAUSES AND REMEDIES

By LIEUTENANT (J. G.) R. C. SAUFLEY, U. S. Navy

In the early stages of torpedo practice, in fact not infrequently in recent times, it often happened that erratic performances of this weapon were looked upon in mystery, and the only explanation offered was that the torpedo was a freak. Fortunately the recovery of most of these abnormal torpedoes enabled the personnel in charge to find out the definite cause of troubles and to devise some remedy against similar occurrences. It was also found that certain precautions had to be taken in the care, preservation and adjustment of the torpedo to insure against the wreckage of the entire apparatus and that if these precautions were observed the torpedo behaved properly; if not an erratic performance ensued.

The development of aeroplanes and the operation thereof has progressed along similar lines, with the disagreeable exceptions, however, in that the personal equation is introduced in the latter and that the wreckage of recovered machinery is usually too confused to make the solution of the trouble apparent. There is an authentic instance of a so called freak performance of an aeroplane after which the pilot, who had luckily succeeded in righting his machine, foreswore aviation on the ground that some machines were uncanny. As a matter of fact his machine had acted only naturally, just as the gyro acts, in "tumbling" sometimes, naturally obeying the laws of precession. The occasional escape of a pilot from aeroplane accidents affords some account of what took place in these accidents. The experiences of the actual-flyer together with a conservative application of the laws of natural philosophy, experiments upon strength of material, wind and gust stresses etc., have given a clear idea of the phenomenon of flight, so that the accidents nowadays which throw mystery into the popular mind, are not difficult to explain and are by no means unavoidable. As aviation stands now the precautions

to be taken before the flight of an aeroplane are as definitely known as those prescribed for torpedoes, and were it not for errors in piloting, casualties due to material would be few indeed and fatalities to personnel even rarer. Obviously aeroplane accidents are attributable to three general causes, namely:

(1) Air conditions.
(2) Material.
(3) Personal error.

In the first stages of aeroplane construction when the factor of safety was small and the machines were slow and under powered, casualties from causes Nos. 1 and 2 were frequent. As frequent as they may have been, however, it is more than probable that the majority of casualities were due to personal errors rather than to weakness of material or atmospheric conditions. In assuming, however, that the majority of aeroplane accidents are due to general cause No. 3, it is not to be inferred that accidents are practically eliminated, for there is no factor more variable than the personal factor and none more vital in the operation of aircraft. Unfortunately for both military and naval aviation, the War and Navy Departments have been forced to purchase only such material as was obtainable in this country, and this too in limited quantities.

The science of aeroplane construction in the United States appears, however, to be improving, especially in one or two companies, but up to date it has been patent to all flyers, who have had the opportunity to observe, that the strength, design, workmanship and finish of foreign material are vastly superior to anything we have. This fact must therefore be taken into consideration in mentioning such accidents, due to material, that may be hereinafter enumerated.

ACCIDENTS DUE TO AIR CONDITIONS

In a machine of a given weight, lifting surface and coefficient of fineness, there is a definite minimum velocity relative to the air from which sustentation can be gained. Corresponding to this speed there is but one angle of incidence at which the machine can fly. This speed is known as the lower critical speed in order to distinguish it from the other critical speed existing at the high-speed end of the speed incidence curve. Now, up to 1913-14, most of the machines built in the United States, especially the Wright, were of slow speed. Some of these types were slow due to design

and others to the fact that the motors were underpowered. The range of safe flying speeds was therefore much reduced in both instances. As a consequence it made little difference whether the machines were flying at their normal incidence or at the critical speed, the velocity of air under the lifting surface was so small that the decelerations encountered in disturbed air, however small they may be, were often sufficient to reduce the relative velocity below that necessary for sustentation and dynamic control; and the machine fell. The mere fact that the speed of old time machines was slow does not necessarily mean that gust actions in such cases would probably be fatal. The serious point with the old slow speed machine is that the range of safe speeds is small and that its normal speed is essentially close to its critical speed. Another serious difficulty is that in the slow speed machine the stabilizing surfaces lack the dynamic righting moment possessed by such surfaces in high speed machines. Hence it has frequently happened that machines have been wrecked by gusts, not because the gust deprived the machine of control but that its righting moments were too slow to enable the pilot to avoid obstacles which chanced to be near. In many of the worst aeroplane accidents, which were obviously due to gust action, the personal error was so great due to the fact that the pilot was ignorant of the machine's critical angle, that, had this error been eliminated, the gust force alone would have been unable to upset the machine's equilibrium. It is thus seen that causes of accidents which are often attributed to gusts, are so closely related to personal errors that it may be a mooted question where to place the blame. The motor may be gradually failing; the pilot may be ignorant of this fact when a gust suddenly robs the machine of control and sustentation; and wreckage ensues. It has sometimes happened that sentiment for the pilot has thrown the burden of the accident upon the precipitating cause; and gust-action is accordingly classified as one of the great causes of aeroplane accidents.

Gusts upon aeroplanes may be classified under four headings although they frequently attack a machine in a combination. The general effects upon an aeroplane, in so far as accidents are concerned, may be studied in any one of the four headings:

(1) Rear gusts.
(2) Downward gusts.
(3) Head gusts.
(4) Upward gusts.

To avoid confusion in studying gust action and effect upon an aeroplane, it must be continually borne in mind that the stability of a machine depends upon gravity relative to the air rather than upon the absolute gravity. It must also be remembered that in the problem of stability, it is the machine's path relative to the air, not its absolute path, that must be taken into account.

The foregoing enumeration is in order of relative importance to the machine's stability. The downward gust, which is severer in effect than the rear gust, has not as many accidents to its charge as the rear gust for the reason that downward gusts are, as a rule, encountered in very disturbed air, under which conditions attempts at flight are infrequent, while the rear gust frequently occurs when air conditions are apparently normal.

ACCIDENTS DUE TO REAR GUSTS

The simplest explanation of this phenomenon is that the aeroplane flies suddenly into a region of air being accelerated in the direction of the machine's path. Were the air acceleration strong enough, the direction of air flow through the wings would be momentarily reversed, and the machine would drop precipitously. There is however, no record of air currents being accelerated to such an extent, no matter what velocity the wind may have. Experiments have found few air accelerations beyond fifteen miles per hour, though it is believed that in electric and cyclonic storms they are much greater. What ordinarily happens is that the velocity relative to the aeroplane is momentarily reduced and, the machine's inertia preventing an immediate absorption of the gust's speed, lift and control are lost. The old popular idea of an aeroplane " getting a puff under the tail " or of a " puff coming up from behind " is quite incorrect. Even with very slow aeroplanes it is more than improbable that a gust could overtake them. The term " rear gust " is therefore a misnomer and no doubt came into use during the early stages of aviation when gust action was not understood. The aeroplane in rear gusts noses downward, throwing the tail upward, thus giving the idea that a gust has come up under the tail. An upward gust striking the tail surface only would, to an observer on the ground, appear to effect the machine similarly to a rear gust, but the " feel " of the machine would be different in that control would not be lost. If the machine be close to the earth when a strong upward gust strikes the tail surfaces

there would be danger of the nose striking, but with seaplanes, it would probably mean nothing more than porpoising and certainly not the incorrigible "nose-dive" resulting from rear gusts.

The effect of a rear gust upon an aeroplane may possibly be better understood when the consideration of air velocity is disregarded and the machine is assumed to be sustained in normal flight. With these premises, any variation in the conduct of the machine must be due to a variation of "gravity relative to the air."

It is very important that this latter expression be thoroughly understood. When a machine is being sustained in undisturbed air, that is, air whose velocity is undergoing no accelerations or decelerations—gravity relative to the air and absolute gravity are the same. It must be borne in mind that gravity is nothing more than a downward accelerating force. Now if the supporting

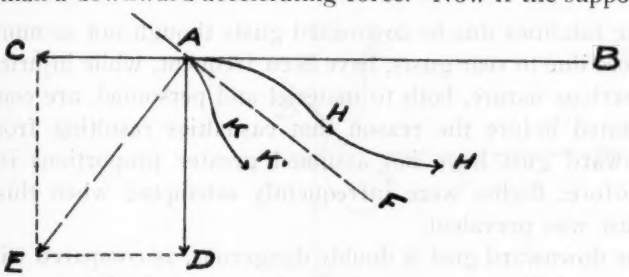

FIG. 1

medium be suddenly accelerated, the machine's equilibrium must be momentarily adjusted to the resultant of the two accelerations, gravity and the gust. This resultant is the new gravity relative to the air, the direction of which is perpendicular to the earth only when the air acceleration—gust—is directly upward or downward.

Now let it be considered that the aeroplane is sustained in flight at the point *A*, flying in the direction *AB*, when it is attacked by a rear gust of force *CA*, (Fig. 1).

Now it must be further borne in mind that the reason air accelerations are considered gusts is that the inertia of the aeroplane prevents an immediate assumption of the gust velocity. Therefore if the air is being accelerated in the direction *CA* relative to the aeroplane, then the aeroplane is being accelerated in the direction of *AC* and with the force *AC* relative to the air. Thus the machine is simultaneously subjected to two accelerations *AC* and

AD, or the resultant *AE*. Therefore, the virtual horizontal is *AF*, at right angles to virtual gravity *AE*. Now it was assumed that the aeroplane had just sufficient power to sustain it in the horizontal with reference to *AD*. With the new gravity *AE*, the machine attempts to adjust itself to the virtual horizontal *AF*. But gravity has not only changed in direction; its force also is increased. The machine therefore drops along lines anywhere between *AKK'* and *AHH'*, according to the duration of the gust, the inertia of the machine and the damping effects of its stabilizing surfaces. An inspection of the paths *AHH'* and *AKK'* will disclose the improbability of recovery by a machine (without reserve power) when attacked by a violent rear gust at a low altitude.

ACCIDENTS DUE TO DOWNWARD GUSTS

The fatalities due to downward gusts though not as numerous as those due to rear gusts, have been frequent, while injuries of a less serious nature, both to matériel and personnel, are common. As stated before the reason that casualties resulting from the downward gust have not assumed greater proportions is that, heretofore, flights were infrequently attempted when this type of gust was prevalent.

The downward gust is doubly dangerous, as compared with the rear gust, both on account of the dangerous absolute path of the machine and its critical incidence to the air when the gust is past. It has often happened in exhibition flying that the pilot, while attempting to trim a pylon or the corner of a building closely, has been thrown down upon the very object which he was sure of clearing. There have been several fatalities on hot aviation fields (due to turbulent air rising therefrom) when the aeroplane, at an altitude of a few feet after rising or within a few feet of landing, was smashed bodily to earth.

With reference to the aeroplane's conduct during a downward gust and its attitude relative to the air after the gust is past, it would appear at first glance that in these respects its condition would not be serious. An examination, however, of the relative gravity diagram will reveal the hazardous position of the machine (Fig. 2).

Assume *A* the position at a given instant flying horizontally in direction *AB*, when struck by a downward gust of force *CA*. The acceleration of *A* relative to the air is *AC*, opposite to the direction

of the gust. Therefore *A* is subjected to two accelerations, opposite in direction *AC* and *AG*, which is absolute gravity. Thus gravity relative to the air is momentarily reduced, and, if the gust be strong enough, relative gravity is reversed. The path of the machine relative to the air is in the direction *AF* or *AE* according to its damping qualities. The absolute path however, is in the direction *AL* or *AI*, which illustrates the double danger due to attitude relative to the air and to the earth when the machine is at low altitudes. The downward gust accounts for the phenomenon observed in very disturbed air when the machine seems to be struck with such violence as to make a small wrench or pliers jump up from the pilot's seat.

To the downward gust may be attributed many stalls that are ordinarily assumed to have arisen from other causes and it has

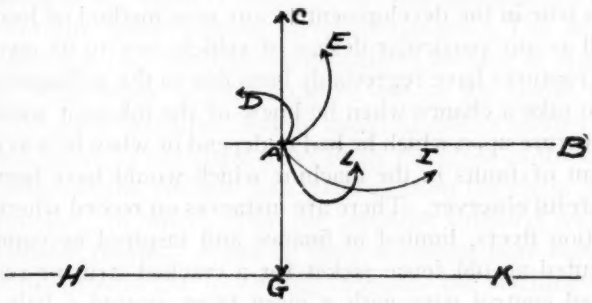

FIG. 2

sometimes caused the smash of land machines when they have been thrown bodily to the earth just after making the "get-a-way."

ACCIDENTS DUE TO HEAD GUSTS

Assuming the machine to be in normal flight, the encounter of a head gust momentarily increases the velocity of air under the lifting surfaces, thereby increasing the lift under the machine. The latter immediately starts to climb. When the gust is past, the machine being pointed upward retakes the undisturbed air at a larger angle than it can fly. Hence a stall ensues. The dangers of head gusts are fewer and smaller than those attributed to the foregoing causes, however great may be the dangers resulting from a stall. Stalling may be brought about in so many ways—by personnel, material, or air conditions—that it will be treated

later under a separate heading. Since the head gust may cause a stall, it is classified as an air condition that may cause aeroplane accidents. However, with an aeroplane possessing a normal reserve power a pilot of fair skill may employ the pure head gust quite advantageously in an effort to make a rapid climb. Sufficient practice will enable him reflexively to push down the elevator towards the end of the gust, decreasing the incidence as the deceleration of the gust increases it, thereby maintaining the aeroplane at an incidence for which it is designed.

Very few accidents if any, are due to the upward gust. Discussion of this feature of air conditions is therefore unnecessary.

ACCIDENTS DUE TO RUPTURES OF MATERIAL

Fatalities due to material unquestionably have been frequent. This is true in the development of any new method of locomotion, as well as any particular design of vehicle new to its own specie. Many ruptures have regrettably been due to the willingness of the pilot to take a chance when he knew of the inherent weakness of the structure upon which he had to depend or when he was culpably ignorant of faults in the machine which would have been patent to a careful observer. There are instances on record where certain exhibition flyers, limited in finance and inspired by competition, substituted an old fence picket for a cracked strut or renewed a stranded control wire with a piece from around a bale of hay. It is needless to mention the resultant casualties. A notable example of folly in disposition of aeroplane material recently occurred when the drift wires were reduced to such an extent that it was impossible for the wing to withstand the stresses due to high speed; and total collapse followed.

There has been, however, a steady and rapid improvement in material, and fatalities, marked against material as a primary cause, are quite frequently due to the locality in which the aeroplane is forced to land. At the Aeronautic Station casualties in material are still numerous, principally on account of the power plants. Among the incidents mentioned below escapes of the pilot have been due to only good luck. The following are a few instances:

(a) *Crank Case Explosions.*—This has occurred several times. Debris of the motor shot through the planes at several points, cracked struts and narrowly missed the pilot's head. These explo-

sions were due to poor material in cylinders, in pistons and piston rings, which allowed an explosive mixture to accumulate in the crank case and finally to ignite from the regular explosion within the cylinder. Remedies for such faults suggest themselves.

(b) *Breakage of Piston Heads and Walls.*—This has happened a few times without disabling but one cylinder. At other times it has resulted similarly to crank case explosions. The pistons appeared to be cast from poor material and to have been poorly and unevenly finished. In fine there appeared to be no necessity for having such a piston although the motor containing it was the best that could be obtained on the American market. Government inspection at aeroplane factories promises to relieve this difficulty.

(c) *Ruptures of Chain Drive.*—Very few aeroplanes, other than the Wright, employ chain driven propellers. The Wright Company employs two chain driven propellers, turning in opposite directions. This latter feature requires one of the chains to be crossed. Frequent casualties both to material and personnel have been caused either by the chain drive or by the cross in the chain. In some instances the accident has resulted from the chain jumping the sprocket: in others, from the propeller supports weakening, with similar results. A few of these accidents have occurred so close to the ground that by cutting the spark the machine could not be righted from the sudden skewing effect of one propeller. In one instance it was just as well that the machine was close to the water, since the motor's rolling up the cross chain put the warp out of commission, and equilibrium was impossible. The location of the motor forward of the pilot's seat, in the last named accident, was the only thing that saved the personnel from being pulped. Upon impact with the water the motor was thrown out through the bow and was recovered by one wire that did not break.

The undesirable feature of chain drive is as patent in the design of other vehicles as in aeroplanes and will no doubt be eliminated in the future. Closely allied with chain drive in disadvantages is the poorly stranded control wire with its numerous sheaves and fair leads. Many accidents in the early stages of aviation were due to these latter causes, and one may be cited recently in which the parting of an aileron wire caused the wreckage of a machine. Weakly stranded control wires, sheaves and fair leads appear about as antiquated as chain drives. It is expected therefore that

either bell-crank sectors with heavy cables or control rods and levers will soon relieve the devices less safe.

(d) *Casualties Due to Propellers.*—With military aeroplanes propeller ruptures have been few, except when struck by a bullet or shell. The seaplane, on the other hand, has had and will have a harder proposition. Water being 800 times denser than air, the air propeller fares badly even when struck by spray. Up to the present time aeroplane propellers have not been designed, on account of weight and inertia, with a view of withstanding the shock of a wave or heavy spray. As a consequence the propellers furnished our seaplanes have to be resheathed. Before the necessity of such reinforcement was realized some very serious casualties occurred—and this quite recently. In one instance the sheathing of a blade, shaken loose by impact with spray, flew off while the machine was in the air. The high rotational velocity of the propeller threw the sheathing out with great force and cut one of the tail bamboos cleanly out. At the same time the sudden unbalancing of the propeller brought such violent stresses upon the power plant that the sheathing of the other blade was also thrown off, the engine beds cracked and the motor put generally out of commission. Fortunately for the occupants, one wire from the cut bamboo escaped, and this wire carried the tail load during the glide to a safe landing.

For military aeroplanes the tractor type appears to have eliminated dangers from propeller ruptures. For seaplanes the tractor type will relieve the pilot of dangers incident to propeller ruptures, but whether tractor of pusher, in seaplanes, the propeller must be mounted with a good clearance from the water and must also be strongly sheathed in order to withstand the spray that will be encountered now and then. On account of its offensive and propelling efficiency the pusher type of aeroplane is preferred to the tractor. It may be, therefore, that other precautions against the dangers of propeller ruptures will be sought in the former type rather than upon the assumption that the propeller will have to smash sooner or later and should accordingly be upon a tractor mount. In all events it is evident that casualities due to propeller rupture will be of a serious nature, whatever the type of the machine: and thus far only theory, not practice, has found a remedy.

(e) *Accidents Due to Ruptures of Gasoline Tanks or Leads Therefrom.*—There are many cases on record where ruptures of the gasoline tank, exhausting the fuel, have forced landings in undesirable places. There are several instances where back fires from the carburetor have caught in the drip from a gasoline leak and burnt the machine completely. At the Aeronautic Station there have been two notable instances of casualties resulting from gas lead ruptures. In one of these the machine caught fire in the air. The pilot succeeded in reaching the water before the machine was consumed. The exact cause of this accident—what part broke first is not known—but it is more than probable that the rupture was due to the excessive vibration of the Curtiss power plant. In the second of the two accidents mentioned above, the after part of the gasoline tank broke off bodily and struck the propeller. Both blades were broken off close to the hub and the debris of blades and copper were thrown through the right upper wing (Dunne biplane), cutting a strut, cracking the rear spar and tearing out five square feet of surface. The breakage of the propeller unbalanced the motor so suddenly that, before the spark could be cut, the engine beds were badly broken. Luckily the design of the machine (Burgess-Dunne) was such that the debris hurled by the propeller did not cut the controls, and a glide from 1000 feet altitude was made to a safe landing. Several small slivers had, however, punctured the central float, which began filling rapidly, and the machine was saved only by the prompt assistance of the rescue boat.

There are numerous other possibilities of casualties to an aeroplane which, in times of peace, might not prove serious either to matériel or personnel, but which in war would frustrate the machine's mission as effectively as a crank case explosion. Use and vibration effect details of a machine's structure where a defect is least expected, and not infrequently does it happen that some small piece of the power plant or machine's structure, such as a lock washer or the head of a small bolt, is thus broken, which, "per se" is of little importance but when struck by the propeller may cause irreparable damage. As previously pointed out, however, the tractor eliminates the immediate danger of such trouble.

When the subject of material is treated in detail, it becomes an easy matter to enumerate the many things that can go wrong.

But taken as a whole, the obtainable aeroplane material is good and is improving daily. A rigid, systematic inspection of adjustments appears to be the greatest requisite. With this requisite fulfilled the percentage of successful flights, despite the counterweight in the risk and loss of human life, is much higher than the percentage of successful torpedo runs.

ACCIDENTS DUE TO PERSONNEL

Accidents due to personnel, while varied in cause and in form, may be generally classified as follows:

1. Bad getaways.
2. Bad landings.
3. Side-slipping.
4. Working into the vortex of a spiral.
5. Stalling.

The above enumeration is made in the inverse order of importance. Bad getaways and bad landings are by far the most frequent, and, while hard on the aeroplane, they are less frequently fatal to the pilot. Except where forced landings bring the aeroplane down into exceedingly rough country or into local conditions which a pilot would avoid, bad getaways and bad landings are the beginner's faults, which a reasonable amount of practice should overcome. The commonest feature of these two faults is known as "porpoising." Whether in getaways or in landings it is usually caused by holding the boat too much down by the nose so that the reaction between the water and the curvature of the bow forces the machine into the air, when the speed of the air relative to the wings is insufficient to give sustentation. The machine being in a stalled condition drops to the water, nosing down again according to the phenomenon of stalling. This latter conduct causes a repetition of the performance, two or three times if the motor is dead, and almost a continuous performance if the reserve power is poor and the water rough, and the elevator badly handled. When the water is rough the porpoising is more violent and the machine's headway more reduced by impact with the slope of waves. It is for this reason, when the reserve power is weak, that it requires a judicious use of the elevator to recover from the porpoised condition; otherwise it would be better for the beginner to throttle down and abide the consequences of the second or third porpoise, rather than hold the throttle open and continue, by

improper use of elevator, to pound the machine into the waves. When the aeroplane is equipped with a motor of good reserve power, the effects of porpoising are almost nil, since the large thrust of the propeller is sufficient to recover flying speed before the second impact with the water. It is probable that the most serious effects of porpoising are found during subsequent flights when the machine's strained condition permits of ruptures which would otherwise be inexplicable.

Side-Slipping.—When an aeroplane is stable on its flight path, the air streamline should attack at right angles to the span. If the air attack is at an angle other than 90° to the span, the machine side-slips or skids. Like many other dangerous phenomena of flight, side-slipping is particularly dangerous when the aeroplane

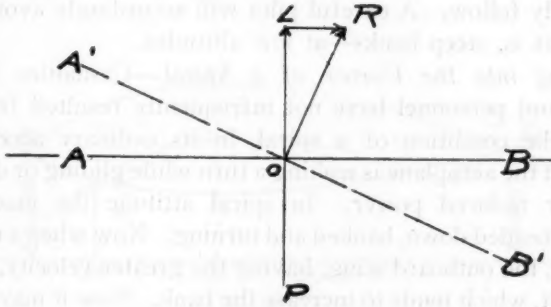

FIG. 3

is so close to some fixed object as to make improbable the regaining of stability before collision. Side-slipping toward the center while the aeroplane is banked on a turn has caused a greater number of accidents than skidding outboard. A number of pilots have been badly hurt thereby, a few have been killed, and a great number of machines demolished. The cause of side-slipping will be more easily understood from the accompanying diagram (Fig. 3).

Let AB represent the surface of an aeroplane flying straight-away from the observer. P is the weight of the machine and L is the lift, which under the assumption of horizontal flight is equal and opposite to P. Assume now that the pilot wishes to turn to the right. He puts the rudder to the right and at the same time banks the machine along $A'B'$ to prevent skidding outboard. The reaction to the lifting surface is now along OR. Therefore

if the pilot wishes to maintain his altitude, he must either open the throttle a little more or increase the angle of incidence of the lifting surface, otherwise *OL*, the vertical component of *OR* will be less than the weight *OP*. Assuming that the motor is running "all out" or that the reserve does not permit of an increase of incidence, banking the machine will unbalance *OL* and *OP*, thus leaving the aeroplane to the resultant of the downward force (*OP-OL*) and the centripetal force *LR*. The result is side-slipping. Now side-slipping obliques the air flow to the wing span, a condition which further decreases *OL*. Additional decrease of *OL* tends to increase the side slip, so that the two accentuate each other. It is therefore apparent, when the aeroplane is close to the earth, that unless side-slipping is quickly corrected, a smash will quickly follow. A careful pilot will accordingly avoid sharp turns—that is, steep banks—at low altitudes.

Working into the Vortex of a Spiral.—Casualties both to materiel and personnel have not infrequently resulted from this cause. The condition of a spiral, in its ordinary acceptation, means that the aeroplane is making a turn while gliding or descending under reduced power. In spiral attitude the machine is therefore headed down, banked and turning. Now when a machine is turning, the outboard wing, having the greater velocity, has the greater lift, which tends to increase the bank. Now it may be seen from the last diagram that the lateral component of *OR* is a centripetal effect which produces turning. Turning produces banking and banking produces turning, so that each phenomenon increases the other. The radius of a spiral will therefore continuously decrease unless the pilot operates his controls to prevent such action. Meanwhile the machine is headed down; and it sometimes happens that the machine works into the vortex and approaches to a condition of spinning about its own longitudinal axis. Such a predicament would naturally be confusing, especially at low altitudes, where the pilot would probably start working all controls at once. Consequently if he pulled up the elevator, as his reflexes might prompt, the banked position of the machine would give the elevator such a rudder component as to make the spiral sharper without decreasing the slope of the flight path. As a consequence the uncontrolled machine smashes into the earth. It is hard to get safely out of a bad spiral. The safe policy, therefore, is to make them wide.

Stalling.—Although stalling is a common reference in popular accounts of aeroplane accidents, there appears to be a vague idea of this phenomenon even amongst flyers. The ordinary occurrence of the stalling of an automobile has associated the idea of engine stall so closely with the stall of an aerofoil that it is necessary to explain how the latter is a distinct phenomenon, which may or may not be caused by the motor, and which may occur in climbing flight, horizontal flight or in gliding flight. The clearest idea of the "aeroplane stall" is obtained by keeping in mind that it is not the aeroplane's attitude to the horizontal plane that determines its stability, but its velocity relative to the air. The minimum speed at which aeroplanes may fly varies with the design of the machine, but for every aerofoil there is a definite minimum air speed at

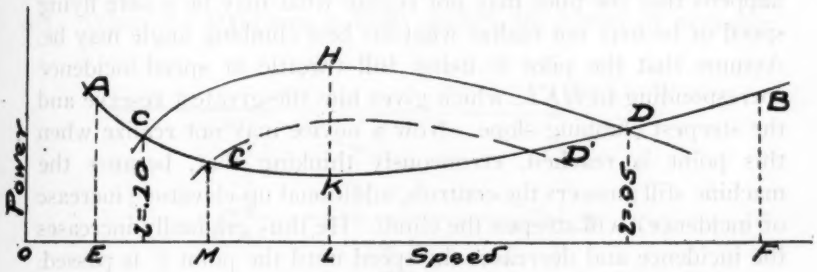

FIG. 4

which it will respond to the movements of the controls. When the aeroplane, at this reduced air speed, fails to answer control, it is said to be "stalled." The angle of incidence corresponding to the speed at which control is lost is called the "stalling angle" (Fig. 4).

In the accompanying diagram the graph *AB* represents the power required to sustain a given aeroplane in horizontal flight at corresponding speeds between *E* and *F*. The portion of the curve beyond *D* corresponds to high speeds at incidences so small as to incur the danger of getting a sudden pressure on top of the lifting surfaces. This portion need not therefore be considered with reference to stalling. The point *C* on the curve *AB* marks the speed and incidence, of this particular aeroplane, at which control is lost. In this connection it must be remembered that the speed of an aeroplane is a function of the angle of incidence, while the lift and the slope of the flight path are functions of the

propeller thrust. In other words an increase of thrust, for a given angle of incidence, only increases the steepness of the climbing path without increasing the speed of the aeroplane thereon. Therefore for a given aeroplane there is a limit to the increase of the angle of incidence regardless of the power applied. Accordingly to an aeroplane of the characteristic curve *AB*, it is advisable to adopt a propelling plant, which, for the speeds at which the aeroplane is designed to fly, will deliver, at full throttle, the powers indicated along the curve *CD*. Examination of the superposed graphs shows that between the points *C* and *D* this aeroplane is flying at both safe speeds and safe incidences, and that, using full throttle there is a reserve power represented by the difference between ordinates of the curves *CD* and *AB*. Now it sometimes happens that the pilot may not realize what may be a safe flying speed or he may not realize what his best climbing angle may be. Assume that the pilot is using full throttle at speed-incidence corresponding to *HKL*, which gives him the greatest reserve and the steepest climbing slope. Now a novice may not realize when this point is reached, erroneously thinking that, because the machine still answers the controls, additional up-elevator (increase of incidence) will steepen the climb. He thus gradually increases the incidence and decreases the speed until the point *C* is passed. The aeroplane stalls and drops without control.

Suppose, however, that the aeroplane is fitted with a power plant delivering at full throttle as represented by *C'D'*. Or, suppose that the original power plant is failing, and, at full throttle, can deliver only as represented by *C'D'*. Now if the pilot repeat his performance, the aeroplane may not stall so abruptly after passing the point *C'* as it did upon passing *C*, for the aeroplane, though lacking the lift necessary for sustentation in horizontal flight, still has a speed corresponding to *C'*, at which speed the aeroplane will answer the controls. What takes place is as follows:

At *C'* sustentation for horizontal flight being lost, the aeroplane starts to descend. The pilot, still feeling that he has control, does not allow the machine to lie upon the flight path, but continues to pull the elevator up. The path of the aeroplane then becomes *PS* the resultant of two motions *PM* and *PG* (Fig. 5). Before the aeroplane began to lose altitude the angle of incidence was *NPM*. With the machine descending however, and held in its former attitude by the pilot, the angle of incidence jumps to *NPS*.

Then there is a quick change of speed-incidence from C' to C; and the aeroplane stalls.

In gliding flight there is no propeller thrust. Therefore the equivalent of the propeller thrust necessary to preserve the equilibrium of the aeroplane must be found in the component of the force of gravity along the flight path. Pursuit of the analogy makes it obvious that the angle of incidence may cause stalling on a glide in the same way as in horizontal or climbing flight.

As mentioned in the foregoing, one of the peculiar features of stalling is the "nose-dive." This phenomenon is easy to explain. Within the ordinary limits of incidence the center of pressure is situated at distances from the wing's leading edge, varying from .25 to .4 of the wing's depth (chord). At increasing the incidence beyond the critical angle, the center of pressure begins travelling aft. When the aeroplane is badly stalled, the center of pressure

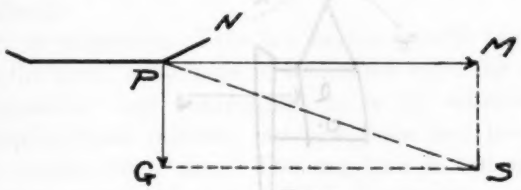

FIG. 5

travels aft rapidly, reaching a position of about one-half chord. Now when an aeroplane is in equilibrium, the resultant of all pressures passes through the center of gravity, which, of course is fixed. When the center of pressure jumps abaft the center of gravity, the forces are unbalanced, the pressure has a big moment about the center of gravity, and the machine goes into the nose dive. Obviously if the aeroplane goes squarely into the nose-dive, it will, provided the altitude be sufficient, regain sufficient speed for control. Unfortunately in the most stalls on record the altitude was not sufficient. Each week there are numerous cases of intentional stalls during exhibition flights at altitudes of 1000 feet or more, where the aeroplane comes out of the nose-dive in good order. There are other instances of stalls at safe altitudes where the pilot failed, through ignorance, to extricate the machine. There is one instance, mentioned in the foregoing, when an aeroplane stalled at a safe altitude, nose-dived for several hundred feet and was finally righted by a chance maneuver close to the

earth. Up to this maneuver, despite the fact that the regained speed was ample, the aeroplane refused to answer the controls. This phenomenon may be explained as follows (Fig. 6):

When, during a nose-dive, the aeroplane has gathered excessive speed, as will be the case in 400 feet or more, the incidence of the main surfaces become very small. Now at very small incidences of cambered surfaces, the center of pressure travels aft to positions varying between .4 and .55 of the chord. Thus the travel of the center of pressure on cambered surfaces tends to accentuate a decrease of incidence. It is seen therefore that both for excessively large and excessively small incidences the center of pressure moves aft. As said before the position of the center of gravity remains a fixed point about which the moments of the lifting surface and

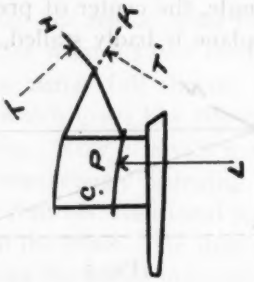

FIG. 6

control surface pressures must be taken. From Fig. 6 it is seen that, for very small incidences, the pressure on the main surfaces has a moment about C (center of gravity) equal to $L x CP$. The pilot would naturally have the elevator pulled up to the position DH, in which position the moment of the elevator pressure about C is equal to $T x DC$. Now if the aeroplane refuse to answer the control, it follows that $L x CP$ is equal to $T x DC$, a condition which may be called the "balance of forces." Since, while the moments are equal, the total pressure on the main surfaces, L, is much larger than the total pressure on the elevator, T, it follows that the aeroplane, thus caught in irons, will receive a translating force, without showing a tendency to come out of the nose-dive. Now what the pilot should do in the above condition is to throw the elevator to the position DK. The moments $L x CP$ and $T' x DC$ would then be in the same direction. The motion of the aeroplane would

relieve the pressure on the main surfaces. Then a quick reversal of the elevator back to the position *HD* would give an unbalanced moment to *TxDC,* which would swing the aeroplane to a positive incidence sufficiently large to reduce the moment of *L,* and to allow the elevator to have control. This latter maneuver was the one which saved the pilot mentioned in the foregoing as having foresworn aviation.

With reference to the large and peculiar travel of the center of pressure upon cambered surfaces, it may be said that many of the latest wing sections have been designed to reduce this travel, without greatly impairing the lifting efficiency. As a result of such design the weight of an aeroplane may be so distributed as to bring the center of gravity into approximate coincidence with the center of pressure of the main surfaces, so that regardless of the incidence, *L* has practically no moment, and the elevator has full charge.

The developments of the last twelve months have left no doubt as to the naval advantage to be gained from the use of aircraft. The question now confronting us is not whether aircraft can accomplish their mission, but how soon and how well can the navy acquire their use. The seaplane is but a weapon, and, following the rule of weapons, it is dangerous to him who handles it without interest or without care. Ignorance, not unbelief, is our trouble.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE GREATEST NEED OF THE UNITED STATES NAVY: PROPER ORGANIZATION FOR THE SUCCESSFUL CONDUCT OF WAR

AN ESTIMATE OF THE SITUATION

By LIEUT. COMMANDER W. P. CRONAN, U. S. Navy

Motto: "To win a race, the swiftness of a dart
Availeth not without a timely start."

INTRODUCTION

It is to be presumed that all students of strategy, at least those who have essayed the solution of strategic problems, are familiar with the principles underlying the estimate of the situation.

For the benefit of those who are not familiar with the estimate of the situation, the following brief explanation of its office is offered:

All organized human effort is based upon the recognition and employment of three factors, which are co-equal and interdependent.

These three factors are, first, information; second, reflection and study; and third, execution.

When we receive a letter in the course of business, it is necessary to read it, reflect upon it, and, perhaps, to refer to other correspondence, or to refer to books, in order clearly to understand the subject matter, as affecting our action.

The letter may present a general statement, or situation, from which is obtained a special situation, indicating a mission for the recipient to carry out.

Upon study of the mission, and weighing carefully the relative advantages and disadvantages of certain courses of action open to us, we finally arrive at a decision, and proceed to carry it out; and, having once evaluated the mission, and arrived at the decision, the success of the action depends largely upon the study given in arriving at the decision, and the firmness and resolution employed in carrying it out.

In whatever field of activity, the principle is the same; and the skill with which it is recognized and employed, in most cases unconsciously, governs the degree of success attained.

In the solution of strategic problems nothing should be left to chance; a systematic analysis of all the conditions which confront us is necessary, and a decision must be made as the result of clear and logical thinking. The decision, once made, should be adhered to, so long as the general plan is thereby advanced. A weak or poor decision, resolutely adhered to in course of action, is at any rate better than vacillation, or indecision.

Still, it must be borne in mind that the decision depends upon the mission, and if the mission changes, so must the decision be re-cast.

The course of action indicated by a decision must not be inflexible, for in war it is always the unexpected that happens; we must be prepared for any contingency.

There is nothing new in the principle; it has been employed by masters of strategy for many years, and is merely the Baconian method of inductive logic as applied to the solution of strategic problems.

In making an estimate of the situation, we must always be on our guard not to jump at conclusions, and then to reason so as to justify the conclusions previously assumed. We must proceed step by step, in critical analysis of the problem presented until, by inductive logic, we have arrived at a decision justified by the evidence adduced.

In the solution of problems in strategy it is usual to assume a general statement of the case to present all the facts, and then the special situation which calls for action on our part, from which we derive our mission, and then to group the estimate under four heads, as follows:

1. The mission.
2. The enemy forces; their strength, disposition and probable intentions.
3. Our own forces; their strength, disposition, and the courses open to us.
4. The decision.

The mission is the task assigned to us, and it is necessary first to have a clear understanding of the task.

To that end, the writer will endeavor to present the general situation, followed in sequence by the various processes of reasoning, in an estimate of the situation, to set forth clearly the needs of the navy in organization for war.

GENERAL SITUATIONS: THE RELATION OF THE STATE TO ITS ARMED FORCES

MILITARY POLICY

In every well-organized republic there exists a nicely balanced relation of civil to military power, so arranged that, while civil power is paramount at all times, the exercise of military power, when necessary, is not impeded or handicapped in its effective application, in the transition from a state of peace to a state of war. In order that the transition may be affected without turmoil or friction or costly blunders, it is necessary for a strong state to have a definite military policy, which may be defined as that governmental system of conduct concerned with the development and employment of military (land and sea) forces.

The military policy of the United States appears to be rather indefinite. It is many years since General Upton in his treatise on the Military Policy of the United States set forth with logical clearness the necessity for a definite military policy on the part of the United States.

In an address delivered at the laying of the cornerstone of the Army War College Building in Washington, on the 21st of February, 1903, the Secretary of War, in speaking of the recommendations of General Upton for the improvement of our military system, said:

> More than a quarter of a century later, and long after death had ended the restless striving of the far-seeing intelligence, other men working out the same problems with which he dealt found the sanity and wisdom of his conclusions and gave them effect. Were Upton living to-day, still upon the active list of the army, he would see all of the great reforms, for which he contended, substantially secured. The three battalion system, the interchangeability of staff and line, examinations for promotion, and now, by the wisdom of the present Congress, the establishment of a general staff, and the completion of the system of military education under the controlling body which will find its permanent home in the building whose cornerstone we lay today.

In the preface to the 1904 edition of General Upton's Military Policy of the United States, the following statement appears, affirmed by the Secretary of War:

> Upon the original manuscript, at the foot of the discussion of the War of 1812, is found a penciled note in the handwriting of General Sherman, which concludes in these words:
>
> "I doubt if you will convince the powers that be, but the facts stated, the references from authority, and the military conclusions are most valuable and should be printed and made accessible. The time may not be now, but will come when these will be appreciated, and may bear fruit even in our day.—W. T. SHERMAN."

General Upton performed a great service for his country in setting forth the proper relation of civil to military power, in a republic, so clearly, so logically, by the results of scholarly research extending over twenty years, that finally the principles he set forth were enacted into law, in the relation of civil government to the army of the United States.

The military policy of the nation comprises its program in regard to both land and sea forces, and includes naval policy, which may be defined as that governmental system of conduct concerned with the development and employment of the entire naval establishment.

The United States has no council of the national defence, and consequently it has no definite military policy based upon careful study of exterior issues in the field of world politics. Objection has been made to the establishment of such a body in that it would introduce a feature of government which was not contemplated when the government was organized in its three branches: legislative, executive and judiciary. Since, however, the composition of a council of the national defence would comprise representatives of the three branches of government, it is difficult to see how it could interfere with the proper offices of either branch. At best, such a body need be only advisory in character, and its greatest value would be in facilitating oral communications between the executive and legislative branches of the government.

At present, questions of naval policy are considered and handled by the legislative branch to a degree which appears to militate against the best interests of the executive branch. Questions of naval policy are most properly decided by the Congress, but the responsibility for the execution of that policy devolves upon the executive branch of the government.

There is an analogy between the naval profession and that of the surgeon.

War is a social cancer which occurs from time to time, caused by economic conditions beyond the control of any body of men known as government. To remove this cancer requires the skilled offices of military men, who, like the surgeon, are skilled in the use of the necessary tools with which to effect the operation. He who requires the services of a surgeon should not have the temerity to tell that surgeon how to conduct the operation or what instruments to use, nor should he cavil at the surgeon's fee within reason. The success of the operation being the end in view, the services of the most skilful surgeon would be sought and every opportunity afforded him for the exercise of his skill.

Yet in the relation of the legislative body of the government of the United States towards its military policy, we find a direct violation of this principle. It seems necessary to mention this in passing, before taking up the necessities of the navy within itself, to show how the navy, viewed as an instrument of war, is handicapped at the outset by indefinite naval policy.

SPECIAL SITUATION

NAVAL POLICY

Shall the shores of the United States be protected from invasion by a foreign foe?

Shall the rights of American citizens on the high seas be upheld in accordance with international law?

What influence have the foreign policies of other nations upon the disposition of our fleets?

What influence has the Monroe Doctrine upon our naval policy?

What influence has the Panama Canal on our naval policy?

Do we need a fleet in the Atlantic and one in the Pacific?

What influence does our hegemony in the West Indies, in Mexico, and in Central America have upon our naval policy?

What influence has the defence of our outlying possessions upon our naval policy?

These are questions to be considered in formulating a naval policy; taking into consideration the strength of the forces of our most probable enemies, after close study of the existing economic and political conditions.

All these questions require careful study and analysis before one step should be taken towards the creation of a navy. Either we

need no navy at all or the navy should be adequate to conform to the necessities imposed by such of these various considerations as are comprised in our naval policy.

Such a policy could only be determined after a careful estimate of the situation and comparison of costs, and the question arises whether there now exists in our government any agency for the proper interpretation of naval policy.

The composition of the navy and its use are co-ordinate factors which depend upon naval policy, and this leads us to the consideration of:

PART 1, A. THE MISSION OF THE NAVY

The mission of the navy is to carry out the military policy of the government. If a navy be necessary at all it must be adequate to conform to the military policy of the government, and it must be efficient in carrying out that policy. If there be no military policy, or if it be indefinite, the mission of the navy becomes vague. If the military policy of the government is based upon careful study of extraneous conditions so that the navy becomes an efficient instrument of war to carry out that policy we then have a clear and definite mission.

The military policy of the country may change from time to time as conditions change, and naval policy will change accordingly, but the mission of the navy will remain unchanged, as it adapts itself to conform to the change in policy.

PART 1, B

The mission of this essay is to set forth, as clearly as may be, the necessity for such organization of the navy as will enable it to conform to the military policy of the United States, with the greatest attainable efficiency.

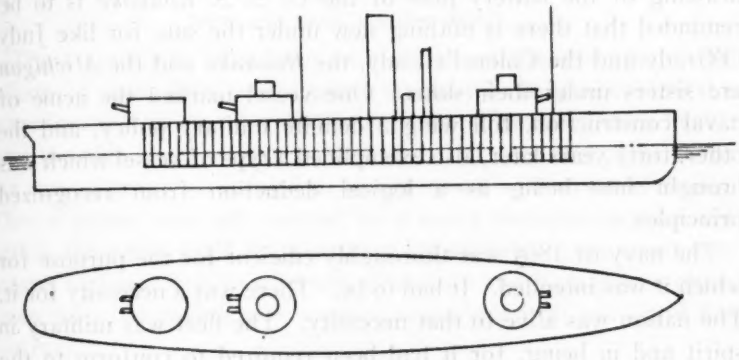
PART 2. THE ENEMY FORCES: THEIR STRENGTH, DISPOSITION AND PROBABLE INTENTIONS

The forces which have prevented the attainment of a high degree of efficiency in organization of the navy can be called enemy forces, and the writer so chooses to call them, *because they have worked in the interests of our possible enemies, rather than for our own interests.*

These forces may be divided into two parts, (a) those within the navy, and (b) those outside the navy.

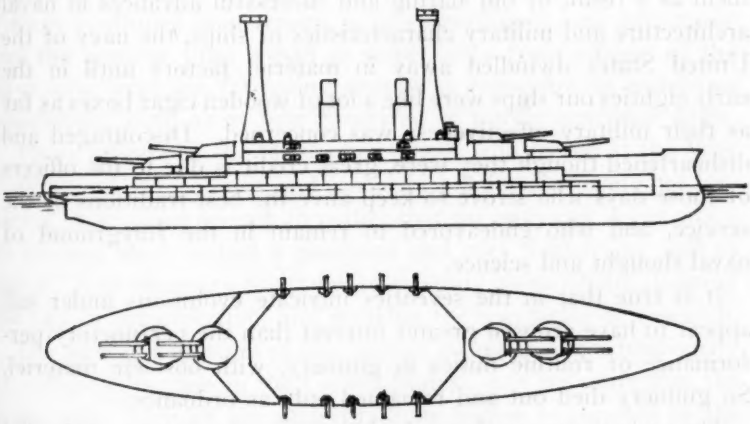
A. FORCES OPPOSED TO PROGRESS WITHIN THE NAVY

Let us begin by reviewing the history of the navy of the United States for the last fifty years, and consider the various barriers



U. S. S. "ROANOKE," 1863
Sea-going Turret Vessel

Armament, two 15-inch, two 11-inch, two 150-pdr. rifled guns. Armor, 1½-in. wrought-iron deck in two layers of ¾ in. each, and side armor, 4½ in. at top, 3½ in. at bottom; wrought-iron plates 4 ft. below and 6 ft. above water-line.



U. S. S. "MICHIGAN," 1909

Armament, eight 12-in. 45 cal. B. L. R., twenty-two 3-in. 50 cal. R. F., four 3-pdr. saluting. Armor belt, 10 in., 11 in., 12 in., at top; 8 in., 9 in., 10 in., at bottom. Casemate, 8 in. at top; 10 in. at bottom. Side plating forward and aft, 1½-in. nickel steel. Protective deck forward, 1½-in., aftr 3-in. nickel steel.

to progress. The navy of 1865 was thoroughly military in so far as the types of vessels were developed to meet the local conditions imposed by the Civil War. Heavily armed and heavily armored

vessels of military characteristics had been developed, as the result of necessity, in large numbers. The all-big-gun ship with guns on the center-line had been developed. For one nowadays to see a drawing of the battery plan of the U. S. S. *Roanoke* is to be reminded that there is nothing new under the sun, for like Judy O'Grady and the Colonel's Lady, the *Roanoke* and the *Michigan* are sisters under their skins. One vessel marked the acme of naval construction, following a definite military policy, and the other, forty years later, also exemplified a type of vessel which was brought into being as a logical deduction from recognized principles.

The navy of 1865 was thoroughly efficient for the purpose for which it was intended. It had to be. There was a necessity for it. The nation was alive to that necessity. The fleet was military in spirit and in being, for it had been required to conform to the necessities of the situation, but when the war was over the great responsibilities of the reconstruction era absorbed the attention of the statesmen of the day. While foreign powers were quick to take advantage of the military lessons which had been taught them as a result of our daring and successful advances in naval architecture and military characteristics of ships, the navy of the United States dwindled away in matériel factors until in the early eighties our ships were like a lot of wooden cigar boxes as far as their military effectiveness was concerned. Discouraged and disheartened though they were, great credit is due to the officers of those days who strove to keep alive the best traditions of the service, and who endeavored to remain in the foreground of naval thought and science.

It is true that in the seventies intricate evolutions under sail appear to have aroused greater interest than the perfunctory performance of routine duties in gunnery, with obsolete matériel. So gunnery died out and remained only as ordnance.

The archaic rites performed with spars and sails were defended by some of the best officers of the navy of that day as necessary in order to preserve the spirit of the navy, which otherwise had been irretrievably injured.

In the early eighties, under the wise guidance of several able statesmen, the navy began again to come into its own in so far as matériel was concerned. As an illustration of the extreme conser-

vatism of navies, mention only need be made of the almost humorous retention of spars and sails in steel ships:

"Same old topsail, same old clew,
Same old engine, same old screw,
Same old navy, nothing new."

There appear to have been two schools of thought among the officers of those days, one of which stuck by its halyards, while the other insisted on manning the downhauls. The downhauls finally won through sheer weight of numbers, but even they, though in the van of progress, seemed to be engrossed with matériel issues. This, it seems, was only natural, as it was a tremendous upheaval within the navy itself to transform its matériel from wood and canvas and cast iron to steel and electricity and high power guns. Even then the saying was wooden ships and iron men, and the contrary.

So the navy struggled along, engrossed with matériel issues until a few far-seeing officers began to realize that the navy was becoming like a man without a soul, and those officers, who deserve great credit, succeeded in the face of much opposition in establishing the Naval War College and all that it stands for. The War College continued in adversity, at times perilously near extinction, and the cruelest jibes it had to suffer were from officers of the navy who were not far-seeing enough to recognize its wondrous possibilities even as at first conceived in purely academic fields.

Those officers of the blue water school who jeered at the War College and its teachings, and ignored its deductions, were not far-seeing or studious enough to realize that the navy can never attain its highest ideals unless it possesses and uses thinkers as well as doers. It is necessary for the navy to study its problems, donning the cap of introspection, and wearing the spectacles of research.

The leading educators of our country complain of the mediocrity of college education in the United States; they maintain that the democratic spirit of the undergraduate bodies is opposed to the scholarship that lifts its head above mediocrity, and that it is this spirit which prevents general attainment of scholarship on a high plane, and lightly refers to such a plane as "high-brow."

The same spirit has been manifest at the Naval Academy; it exists in the navy today. It may be excused or explained as existent among college undergraduates, as due to the irresponsi-

bility or flippancy of youth, but that it should exist among officers of the navy is inexcusable.

Whether or no such mediocrity is one of the defects of democracy, may be considered as belonging in the field of thought of the political scientist, but such mediocrity certainly should have no place in the navy.

As the navy progressed materially it did so without any definite naval policy as a guide. At first battleships were called coast-line battleships, under a misconception of their proper office. The navy's first cruisers of high speed were erroneously called commerce destroyers, without any regard to their relation to the main body of the fleet, all due to the lack of a consistently clear naval policy. Despite all these handicaps the navy continued its struggle, developing its matériel until the war with Spain, from which it emerged successfully despite the lack of appreciation within the service of the true scope and field of the War College.

The navy was engrossed with matériel matters and even though great strides had been in matériel, yet very little had been done in coordinating the various branches of naval activity to conform to any naval policy. There was no proper concept of war, and the operations of the fleet did not properly coordinate personnel training with matériel necessities. The true relation of personnel to matériel had not been evolved.

The gunnery of the navy during the war with Spain, while considered highly successful at the time, is now looked upon as almost a joke, and the navy now realizes how poor it was, and what is more important, the reasons why gunnery was so poor. The navy was long on ordnance and short on gunnery. There was but little naval gunnery, as distinguished from ordnance. Telescopic sights had been installed on some guns, and our navy was in the van in all the matériel advances of ordnance, yet those same telescopic sights were placed on the guns with inadequate recognition of the gunnery principles involved, because there was not enough gunnery in the navy to indicate the defective installation of the telescopic sights. The telescopic sights had come to stay, but poor gunnery retarded their development.

Even though we consider that "All's well that ends well" the fact still remains that our gunnery was execrable; it is not comforting to reflect upon, for we now realize that defective gunnery was due to faulty organization, in that little if any atten-

tion was paid to the reports of our attachés, and that there was no system of independent inspections to pass upon the efficiency of gunnery and to make recommendations for the remedy of defects in the training of personnel or the design of matériel. Nor was there any responsible, competent technical authority to pass upon such recommendations, with authority to direct that they be carried out.

The business of the Navy Department had been distributed by law under certain bureaus, but in the laws establishing these bureaus not one word can be found prescribing their duties in regard to preparedness for war, the end in view for which the navy was created, if national policy should demand it. Everyone in the navy is familiar with the manner in which things drifted along, with all the military features of the naval establishment, where operations were concerned, handled by the Bureau of Navigation, by tacit consent of various secretaries of the navy, and more or less friction and jealously of other bureaus for lack of implied authority on the part of the Bureau of Navigation, until finally the dawning of the light which came forth from the War College showed the need of a proper military conception of the basis of organization of the Navy Department.

Following recognition of the need for organization, a system was instituted in the Navy Department in December, 1909, in which, for the first time, due recognition was given the military relation of the Navy Department, in its *executive management*, to the shore establishment and the fleets of the navy. This was done by the Secretary of the Navy without the sanction of law and the system could be carried out only by the cordial cooperation of the bureaus of the Navy Department, irrespective of any duty in that regard as devolving upon them by law.

The bureaus remained in a sense independent monarchies, there being no legally established organization for the coordination of their efforts in accordance with well-established principles. It is vitally necessary that bureau chiefs can be told what to do; not how to do it—that is their province.

In order to perceive the necessity for proper organization, it is well to examine the causes which led up to the development of the first organization of the Navy Department with a view to the attainment of efficiency toward the end for which it was created, and the causes of the failure of that organization.

As a result of dissatisfaction with the operations of the British Army in the field during the South African Campaign, the British Government of that day, in response to public demand, instituted a searching inquiry into the conduct of affairs of the British War Office, by a committee composed of one civilian as president, one naval officer, and an army officer as recorder. The committee of investigation was headed by Viscount Esher and the report of the committee is known as the Report of the Reconstitution Committee on the British War Office. The report was submitted in 1904. He who reads it will find in its clear analysis of the grave defects of organization in the British War Office at that time, an almost exact parallel to the conditions which obtained in the organization of our Navy Department until recent legislation removed them in some degree by a partial recognition of the principle involved.

To summarize the essential features of the Esher report it may be stated that the greatest defects found by the commission were: First, that the British War Office as constituted at the time possessed no thinking department. Second, that as a result of the lack of a thinking department there was no coordination in the efforts of the various matériel bureaus and that moneys were expended by the money spending bureaus without due regard to the efficiency of the British Army in carrying out the military policy of the British Empire. It also pointed out the need for independent inspections, in order that intelligent criticism might be made useful. Subsequently, the British War Office was reorganized, and placed upon an efficient military basis similar in principle to the organization of the British Admiralty.

In our own country two boards have analyzed and reported upon the requirements of organization in the Navy Department in order that the Department may be able efficiently to coordinate its activities with the requirements of naval policy.

The first of these two boards was known as the Moody Board, composed of eight members, three prominent civilians, and five naval officers, and a naval officer as recorder. It was presided over by the Hon. William H. Moody. It submitted its report to the President of the United States in January, 1909. The remarks of the President in submitting the report to Congress indicated the importance which was attached to the subject. No action was

taken by Congress towards the enactment of the necessary laws to put the recommendations of this board into effect.

The second board convened was known as the Swift Board, composed entirely of naval officers, seven in number, with a naval officer as recorder; and while it went far more into details of organization than did the Moody Board, its recognition of the principle involved was practically the same. The report of the board was submitted in October, 1909.

These two reports set forth clearly the basic military principles which apply to the proper organization of the Navy Department in an executive sense. The necessary law to carry either the Moody or Swift report into effect has never been enacted, although approximation thereto has been made in the establishment of the Office of the Chief of Naval Operations. In these reports, submitted by able statesmen and competent naval officers, great stress is laid upon the recognition of four coordinate divisions in the executive administration of the Navy Department; these four coordinate divisions are: Personnel, Operations, Inspections, and Matériel. It was recommended that each division be controlled by its own chief, and that four heads of divisions, collectively with the civil heads of the Department should constitute an executive council for the Department. The reasons for the establishment of these four divisions are clearly set forth in the reports, and space forbids their repetition here. The duties of these heads of divisions, subordinate to civil direction, lie entirely in the field of executive distribution of duties to the various bureaus in order that the strategic requirements of the situation may be met, and in operations of the fleets, and inspections to see that what is done, is well done, or that defects are remedied.

The Swift Board Report was tentatively adopted and put in practice, in 1909. But it had no sanction in law, and failed in practice. The forces opposed to progress, within the navy, were the causes of its failure. These were the same forces which had failed to recognize the vital basic defects in organization which had so long retarded the development of gunnery in our navy. These forces failed to recognize the true relation of personnel and its training, to matériel and its design. The spending bureaus, established by law, were under no competent technical agency, also established by law, to determine and direct expenditures to conform to the strategic requirements of naval policy.

B. FORCES OPPOSED TO PROGRESS OUTSIDE THE NAVY

Chief among these forces is sentiment, as opposed to logic. Logical methods of thought, based upon the consideration of facts, have no place in the minds of those who prefer to muddy the clear waters of reason with the prejudice of sentiment.

There are many well-meaning persons who abhor war, and who contend that the arbitrament of law, as in civil cases, can and should settle the differences between nations as readily as differences between individuals are settled by civil courts. These persons ignore the fact that there are certain international questions which may arise having no basic, mutually accepted law to govern them; until all nations are as one, in their acceptance of law, there are bound to be certain differences beyond the pale of arbitrament, where national safety or integrity, or freedom from invasion and alien rule is the issue at stake.

With society constituted as it is, for the present, at least, we must accept facts as they are, and reason in the light of those facts.

While it is true that civil issues are settled without the use of force, within civilized states, this does not necessarily mean that the use of force is wrong. Holy Writ is full of instances authorizing the use of force, on the part of duly constituted authority, for the righting of wrongs, and to further the ends of justice.

In fact, all governments are founded on force, in the last analysis. Murder, theft and arson, pillage, rapine and plunder are prevented by the strong arm of the municipality, state or nation. The entire machinery of the state is brought to bear on the vigorous prosecution of criminal cases, and the state exercises the right of extermination, if necessary, in dealing with certain crimes, according to law. To say that such force is wrongfully applied, or unnecessary, is as weak an argument as to contend that no cause for such force exists.

That would be to say that there are no wrong-doers, no crooks of various types, no thieves and no murderers.

The effect of the propaganda of those who are inspired by such sentiments is insidious and far-reaching, and has had great effect in limiting our naval readiness for war. It would not matter so much, had the movement been world wide, but in the meantime other nations have gone on in their preparations for war to a degree which we cannot afford to disregard or ignore.

Another chief source of weakness, from without, is due to ignorance of naval requirements and standards on the part of the public.

It is the people's navy; they command its fortunes and its fate, through their representatives. Vast sums of money have been expended for the navy, particularly during the past ten years.

Another cause for halting the development of the navy has perhaps been the feeling that strong armed forces lead up to and cause wars. The history of our navy should dispel that fear. The navy has ever been the strong right arm of the nation, slow to wrath. However indirectly, the navy saved the Union.

The files of the Navy Department are replete with instances where the State Department has thanked the navy for its diplomatic victories, conducted with courteous regard for the rights of weaker powers, and based upon a sound knowledge of International Law.

It is probable that the Naval Committee of the House has more to do with naval policy than any other agency of the government, and it would appear that twenty representative men of civil professions, usually entirely unfamiliar with technical naval matters, especially in the esoteric fields of strategy, could have but slight knowledge of any other phases of naval policy than the assertion of the policy itself and the enactment of laws with which to appropriate the moneys necessary for the proper execution of their policy.

The location of naval bases, navy yards, and stations should be dependent upon military necessity, and not upon local political expediency. The question as to whether any navy yard is useful or the contrary should not be left to political fortune but should be based entirely upon a careful study of the advantages and disadvantages of the locality in regard to its availability in serving the fleet. One yard may possess ideal characteristics for a submarine base, another for destroyers, another for battleships; having due regard for the sources of supply of material, labor, ease of transportation, depth of water, facilities for training, and general strategic properties.

C. THE ENEMY FORCES: THEIR PROBABLE INTENTIONS

Again dividing these forces into two parts, (a) those within the navy, and (b) those outside the navy, we may first consider (a); these forces may be expected to diminish, with the growth of

understanding of the principles underlying proper organization, as military education becomes diffused throughout the navy, as a result of the teachings of the War College. Military education should begin at the Naval Academy, where minds are plastic. (b) The forces opposed to progress, in naval organization, directed from outside the navy, may be expected to continue in future, as in the past; but their effect upon the navy may be expected to diminish in direct ratio to the growth of intelligent public opinion on the subject.

PART 3. OUR OWN FORCES: THEIR STRENGTH, DISPOSITION AND THE COURSES OF ACTION OPEN TO US

A. FORCES WITHIN THE NAVY, WHICH HAVE ASSISTED PROGRESS, AND IMPROVED ORGANIZATION

It was not until 1902, four years after the war with Spain, that the proper relation of personnel to matériel was recognized in reference to naval gunnery. This relation was clearly indicated by an able officer of the navy who had even to risk his commission in endeavoring to overcome the inertia of the Navy Department, in his efforts to correct the evils which existed as a result of the absolute lack of appreciation of the true principles involved in proper gunnery training. If it had not been for the personal interest and earnest efforts of the President of the United States at that time, it is interesting to conjecture when the Navy Department would have awakened to a realization that a long sleep had been enjoyed by naval gunnery since 1865. The rapid improvement of gunnery which resulted when the inertia of the navy Department was overcome, is well known to the service and was astounding to the unintiated.

The recognition of the principle involved was invaluable to the service, for it was not until then that it was realized that improvement of ordnance matériel could be obtained only by intelligent criticism, the fruit of experience in operation under exacting conditions, as closely simulating those of battle as practicable. Previously, poor as it was, the ordnance was better than the gunnery, so the defects of design were not noted. Soon after gunnery was first conducted by methods developed by sound organization, the skill of the gunners exceeded the limits of capability of ordnance as then designed, and design began to follow the demands imposed by skilful operation, and has done so ever since.

As soon as the reasons for the wonderful improvement in naval gunnery were understood a great white light broke upon the naval service. *It was then clearly realized for the first time that naval matériel is a function of the training and skill of naval personnel, for man is mightier than the machine.*

Marked improvement in steaming of vessels and the upkeep of their machinery followed in the wake of the improvement in naval gunnery, based upon the same sound conception of fundemental principles fostered and encouraged by healthy competition.

Remarkable improvement in the performance of torpedoes then followed in the wake of the improvement of steam engineering. This, however, did not take place until 1911, when the torpedo first began to come into its own. Thus we see the development of matériel improvement within the navy until 1912, when a crisis arrived; it was not until approximately that year that the naval service awakened to the fact that a bigger issue was involved than any matériel improvement.

Until 1910 the activities of the Naval War College had been almost entirely academic and it is seemingly by the merest chance that in 1910 a new thought suddenly imposed itself upon the consciousness of the War College.

THE EVOLUTION OF DOCTRINE IN THE UNITED STATES NAVY

A talented and studious officer of the navy, on duty at the Naval War College, was sent to attendance at the Army War College, from 1907 to 1909. It did not take this studious officer long to realize that the fundamental laws of warfare on land were directly applicable to naval operations, and after painstaking study of the principles underlying the strategic successes of Von Moltke and the tactical principles clearly outlined by such authorities as Griepenkerl, Buddecke and Audibert, he was able to lay before the Naval War College, in 1909, a clear and definite conception of the practical application of the laws of war for the use of the navy.

In 1910 the War College adopted the new system and again a great white light broke on the service, especially in 1912, when the War College first laid emphasis upon the importance of doctrine. Until then the navy at large had no clear and definite concept of the art of war and was devoid of true military spirit in an organized sense, disseminated throughout the body by doctrine.

For the first time the importance of a proper conception of what naval doctrine means was made clear to the service and it was also made clear that the highest form of obedience is not blind conformity to commands, but intelligent initiative so exercised by each subordinate commander as to make his action contribute to the successful attainment of the end in view. The importance of this step cannot be over-estimated.

The Naval War College has been of greater practical value to the navy at large during the past five years than at any other time since its institution. The logical methods employed by the masters of strategy in Europe, their logical deduction of the course to be pursued after a careful estimate of existing conditions, have been studied with care during this period, and the necessity for the application of similar sound principles and methods to our naval operations was made evident.

The relatively superior excellence of the noncommissioned officers of the army and of the marine corps, as compared with the petty officers of the navy, had long been a matter of concern among progressive officers of the navy, but having no underlying military concept of the art of war they did not realize that they themselves were standing in the way of similar efficiency. It is only necessary to cite as an illustration of the increase of power on the part of higher command, by delegation of authority, the fact that the power exercised by a corporal in command of a squad of an infantry company does not in any way detract from the authority or power of the captain of that company. On the contrary it increases the flexibility of his command and extends it, especially upon the firing line, because the corporal, by dint of intensive training, is able to conduct himself in an emergency in accordance with the policies of his captain, and so to further the end in view. It seems perhaps trite to mention this minor incident even by way of illustration, but it must be understood in order that an intelligent grasp of the situation may be obtained.

In the clear light thrown on this subject by Griepenkerl the following is quoted from his "Letters on Applied Tactics":

THE ORDER MUST NOT TRESPASS ON THE PROVINCE OF THE SUBORDINATE

This is an error only too often committed both in the field and in the solution of problems. Beware of it.

On principle, your orders should contain only what your subordinate cannot of himself arrange for the carrying out of your intentions. The

details of the execution you must leave to him, especially if your orders require considerable time in transmission, where therefore it is possible that conditions you have presupposed may have completely changed. Through your orders acquaint your subordinate with his *task;* the manner of execution is *his* affair.

Now what is doctrine in a military sense? We have only to read Griepenkerl, the master of tactics, to see that doctrine is a code of principles definitely held by superiors and thoroughly understood in spirit by subordinates. Doctrine is an intelligent comprehension of tasks assigned, coupled with ability to accomplish those tasks with the loyalty and initiative which is the highest form of obedience. Doctrine does not concern itself with methods—it demands results, not excuses. The word " doctrine," as defined by Webster, is inadequate to convey the idea completely, but it is the best word we have for the purpose.

To understand the application of doctrine in a military sense, we may study the application of doctrine in the fields of commercial activity, where it has long been recognized and employed by the great successful commercial companies of our country, who not only spare no pains to perfect their organization, but take care to see that their field forces of buying and selling agents are carefully indoctrinated, in that they are expected to use loyalty, zeal, and intelligent initiative in the relations between their company and the market.

In the stations of one of the greatest and most successful railroads of the United States, there is posted a bulletin for the information of the public, from which the following are excerpts:

The management of the ———— Railroad System believes that the company's greatest asset is the loyalty and efficiency of its men.

This company is endeavoring continually to develop its organization, to assure itself of the loyalty of its men, and to build up an efficient and economical transportation enterprise.

The end in view of the commercial company being results, expressed in terms of dollars and cents, nothing in the way of defective organization can be allowed to interfere with the successful accomplishment of the end in view, and consequently, the need of doctrine is recognized in commercial circles, and doctrine is employed therein with a degree of success that has brought great wealth to the well organized commercial business of our country.

The defect of the navy in that it had no doctrine and that its organization was not in accordance with basic military principles

was not apparent to the officers of the navy themselves until comparatively recently. Now that they have awakened to a realization of the fact that for many years some of the armies and navies of the great powers of the world have employed scientific principles, based upon the strategic successes of Von Moltke, in teaching the art of war, they have come to realize that a great and dire need for recognition of the principles involved confronts our navy, as great as was the need for reform when it was first realized that naval gunnery had been allowed to fall into a deplorable condition. But in order to remedy this grave defect, the navy needs help from without, as was the case in regard to gunnery.

The Development of Organization in the Navy Department

In 1889 a Board on Construction was established by the Secretary of the Navy. We find its duties prescribed in the Navy Regulations, 1900, as follows:

> A board having general supervision over the designing, constructing and equipping of new ships for the navy, known as the Board on Construction, shall be composed of the chiefs of the Bureaus of Equipment, Ordnance, Construction and Repair, and Steam Engineering, the Chief Intelligence Officer, and such other officers as the Secretary of the Navy may designate.

The Chief of the Bureau of Navigation had also become a member of the Board on Construction, by courtesy.

During the Spanish War a Strategy Board was convened on May 2, 1898. This board was composed of the Assistant Secretary of the Navy, four naval officers, and a naval officer as recorder. On the 7th of May, 1898, the Assistant Secretary of the Navy left the board, and on the 20th of May, 1898, one of the naval members was detached. The last session of the board was held on the 24th of August, 1898. The board was called into being to supply the navy with plans of campaign, and when it was dissolved no agency remained for the purpose until the establishment of the General Board.

The General Board was established by a general order of the Navy Department on March 13, 1900, with a view to supplying the need for studied plans of campaign, and to act in an advisory capacity in the military administration of the navy.

The Board on Construction designed all ships of the navy until it was abolished in 1909, when the duties formerly performed by the Board on Construction, in regard to the military characteris-

tics of ships, were assigned to the Aid for Operations and the General Board.

The General Board then supplied the need to the naval establishment of the studies formerly made by the Strategy Board of 1898, and the Board on Construction, but the influence of the General Board in regard to the military characteristics of ships had been felt before the abolishment of the Board on Construction. Until the *Michigan* and *South Carolina* were laid down in 1906, those vessels of the navy which were designed by the Board on Construction had been either, at best, copies of foreign design, or original experiments which were expensive mistakes. Every man-of-war is of necessity a compromise in regard to the requirements of construction, engineering, and ordnance, and it was not until the military characteristics of the ship were first determined and then submitted to the matériel bureaus in order that the vessel might be built to conform to those characteristics that our navy finally succeeded in evolving military designs of vessels which were successful. The ships of the *Michigan* class were the result of such design, and were the first all-big-gun battleships, with guns on the center line, and all vessels designed since 1906 have been developed by the same system.

The designs thus evolved have been copied in all the navies of the world. These designs were the result of the application of gunnery principles to naval construction, and their efficiency was due to the fact that naval gunnery had been developed to a high degree of efficiency in our navy by proper organization, and the General Board was enabled to bring to the question of ship design lessons which had been gained by practical experience in the fleet. No fault can be found with the present system of military design of vessels of the navy, as the value of the advice given by the General Board is beyond question. While the tentatively adopted *Executive* organization of the Navy Department, the Aid System, broke down in practice, the General Board had become indispensable.

The General Board, under the Navy Regulations, has great responsibilities, for it "shall devise measures and plans for the effective preparation and maintenance of the fleet for war." It also prepares plans of campaign and keeps them revised in accordance with the latest information received, and recommends the various types of ships to be employed, and prescribes their military characteristics.

Proper organization cannot exist where the weight of responsibility is not relieved by correlative authority.

In the conduct of war no principle is better established than this: That within the province or territorial limits assigned to any military commander, his authority must be supreme.—Upton, Military Policy of U. S., page 405.

If the present organization of the Navy Department be inadequate for the proper conduct of affairs in time of peace, it cannot serve adequately and properly under the stress of war.

B. FORCES OUTSIDE THE NAVY WHICH ASSIST PROGRESS, AND POINT TO A CLEARER UNDERSTANDING OF THE NEEDS OF THE NAVY IN ORGANIZATION

It is certain that in no field of human activity has more studious research been conducted than in the analysis of the history of war, and of the art of war.

The great authorities on war should be as familiar to naval officers as the authorities on law, medicine or surgery, or statesmanship are to those who follow those professions.

The naval profession is one which includes many professions, and which probably makes more demands upon the exact sciences than any other profession.

The authorities on war, indeed, form a military galaxy, and it would seem that he who runs could read and understand the basic truths set forth on their pages. Of course, those who are swayed by sentiment do not want to believe that what they see therein is true, or that it forms a guide for the future.

But we are not dealing with sentiment, but with cold facts, in the light of reason; if a navy be needed at all, it will be badly needed when called upon, and no pains should be spared in time of peace, to perfect its organization, above all things.

Those who decry adequate and efficient organization for the navy on the ground that it is a menace to our liberties, or incompatible with our system of government, seem to forget that the navy is not the state. The navy is an instrument of the state, and serves the state with an efficiency which is a direct reflex of its organization.

It is traditional that navies have never menaced civil power. On the contrary they have a dependence upon civil power which at times has been almost pathetic, if not tragic. Ministries have sent

fleets to certain disaster as a political sacrifice, despite the fact that those same ministries had failed in time of peace to accord to their fleets that proper measure of recognition which would provide the necessary preparation for the successful conduct of war.

The fact that a naval officer has never been President of the United States has often been remarked, and the reason for it is obvious. Sailors are far removed from the ballot box and knowledge of practical politics. The navy serves the state, and its activities are entirely subordinate to national policy.

Not a shovelful of coal, nor a gallon of oil, nor an ounce of powder can be provided or expended for our navy without the knowledge or consent of civil power. The operations of a fleet are entirely dependent upon intricate mechanism and trained personnel, which cannot be provided without studied effort and adequate, intensive training. Surely, the most efficient organization that can be devised for the navy cannot but redound to the advantage of the state.

Let us analyze the executive organization of our government, so that we can conform our ideas on naval organization to our ideals of government.

The office of the President of the United States carries with it the prerogative of appointment of the heads of all executive departments. The President of the United States is also commander-in-chief of the army and of the navy. It is practically impossible for the President personally to attend to all the vast mass of executive business, therefore, he delegates his authority, as successful business men always do in their management of large corporations.

It is necessary that a spirit of loyal cooperation shall permeate the entire executive establishment of the government of the United States. It appears that this loyal cooperation and unselfish subordination should be the result of corresponding delegation of authority downward throughout the several executive departments. The spirit thus developed, all partisan issues being forgotten, flows throughout as doctrine. Therefore it appears that naval doctrine is a necessity. It also appears that it can easily be gained and that no money need be expended for its acquisition. On the contrary, if the principle of the short ballot, on which the executive business of the United States is managed, were coupled with a budget system of appropriation, greater efficiency and

economy would obtain throughout the entire government structure. This is merely, however, by way of illustration. The important point to be considered as far as the navy is concerned, is that it is practically impossible to have doctrine, that mighty spirit of loyal cooperation, without proper organization.

C. THE COURSE OF ACTION OPEN TO US

It has been said that there is no royal road to knowledge.

This is nowhere so true as in the development of naval thought and science. The marked progress of our navy, especially since the renaissance of gunnery, in 1902, has not been along easy or clearly marked paths.

The best efforts of many minds in the navy have been applied to the solution of the difficult problems which have arisen, with intense devotion on the part of those officers of the navy, to the cause to which they have dedicated their lives. Their efforts to better the navy, and to make it more efficient, have been opposed by inertia and objection from within the navy, as well as from without. This has been due in large measure to ignorance of the underlying principles of military organization which have been the main springs of action of those who had mastered those principles by intensive study and research.

The navy itself is to blame for this condition; and the only course of action which is properly open to officers of the navy is so to prepare themselves, by earnest and conscientious study of the art of war, that the entire navy may think alike, and think rightly, on questions of military organization.

Statesmen and legislators cannot be blamed for inaction, or faulty action, as the result of dissentient opinions expressed to them by officers of the navy.

Summary.—We have seen that whatever successes the navy has attained, in the way of organized effort to better its efficiency, have been obtained in most cases by the sporadic efforts of talented individuals. While some of these successes have been very great, and reflect credit upon their originators, there has been no sound organization, in accord with the principles set forth as vital by the best authorities, to raise the entire leaven to a high standard.

It is axiomatic among organizers that individual mediocrity can be brought to a high standard of efficiency by organized effort.

But the personnel of our navy, particularly the enlisted men, is not mediocre; it is of a high order of intelligence, above the average of civil life, due to careful recruiting. Only about fifteen per cent of applicants are accepted, and that moiety is subjected to rigid tests and thorough winnowing before men are placed in important positions.

Therefore, if the principles of organization which have been laid down as correct by the best authorities, are applied to the organization of the navy as a whole, we may confidently expect a marked increase in efficiency for war.

There is no use blinking the facts: The navy must be ready for war, at all times, or the money spent on it is thrown away, and the lives of its men endangered.

The greater relative importance of the spirit and the morale of the navy, as compared with its matériel, is not always comprehended by the layman, and the navy is generally discussed in terms of ships, guns and torpedoes, with evident lack of appreciation of the fact that battles are fought by men, and that decisions are carried and gained by the skillful employment of trained intellect.

The paramount duty of the navy, in order that the Nation may be properly served, is to foster and to keep alive, within itself, with a true sense of great responsibility, the noble traditions and martial spirit which have been bequeathed to its officers and men as a priceless heritage.

Theories of government may change from time to time, but the duty of the navy remains unchanged.

The navy of the United States is now confronted by a condition, not a theory.

Most of the great Powers of the world have spared no efforts to perfect the organization of their armed forces for the support of their military policies, and the results obtained by them have been marvelous in practical efficiency. As navies are competitive in character, it is absolutely necessary for us to adopt a similar organization for our own navy, or to devise something better, or else to accept the humiliating consequences of defeat, in the event that the navy should ever be called upon to contest the ruthless invasion of our beloved land by some power which had left nothing undone to perfect the efficiency of its armed forces.

It is clearly understood that naval policy is in the field of activities of the statesman, not of the naval officer, in its primary incep-

tion, but it must be made clear that the execution of that policy is primarily the duty of the naval officer. Organization in a fleet, squadron, division or on board individual ships is a vital necessity and no effort is spared to make that organization as nearly perfect as is humanly possible.

The laws of Poseidon are immutable:

> "Tempt not with painted cloth for wood,
> My fraud avenging hosts,
> Nor make at all or all make good
> Your bulwarks and your boasts."

The naval officer, in addition, has to conform to the well-nigh immutable laws of war upon the sea, superposed upon the laws of navigation on the sea, or under the sea.

The navy is an instrument of war and the proper operation of the whole is dependent upon intelligent comprehension by subordinate commanders of the relation of the various component parts to higher command.

The navy has been enabled by the War College to realize that the greatest necessity for the navy is ability to conduct its operations with methods deduced from sound military principles derived from a proper concept of the art of war on the sea.

In order that the navy may be indoctrinated with a proper military conception of its duties in carrying out naval policy, it is essential that there shall be some agency in the naval establishment which shall have power to coordinate its various activities with technical skill. The end in view being naval efficiency, it would appear that the best results could be obtained by careful and intensive study of the necessities imposed by naval policy, by an expert agency in the navy itself. The program determined by expert analysis could then be submitted to the legislative body, as approved by the executive branch, for the enactment of the necessary laws to place the policy into executive being, which all points towards the necessity for the budget system of appropriation. Such a system would combine efficiency with true economy. No moneys could be wasted, for all would be expended in conformity with the end in view.

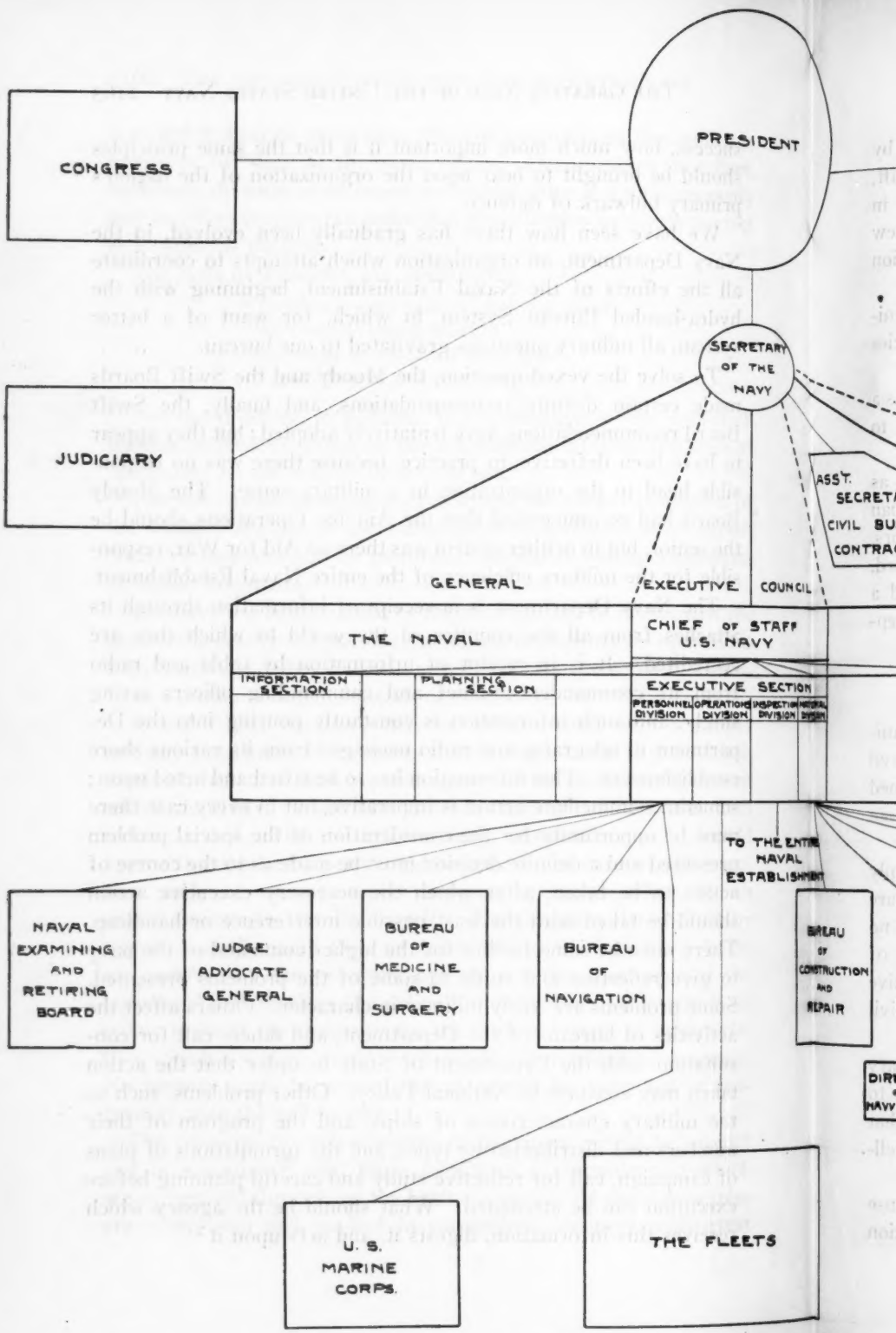
The response to such scientific management would be prompt and in accordance with those principles of organization which are recognized throughout the business world. If these principles are recognized and applied in commercial business with great

success, how much more important it is that the same principles should be brought to bear upon the organization of the nation's primary bulwark of defence.

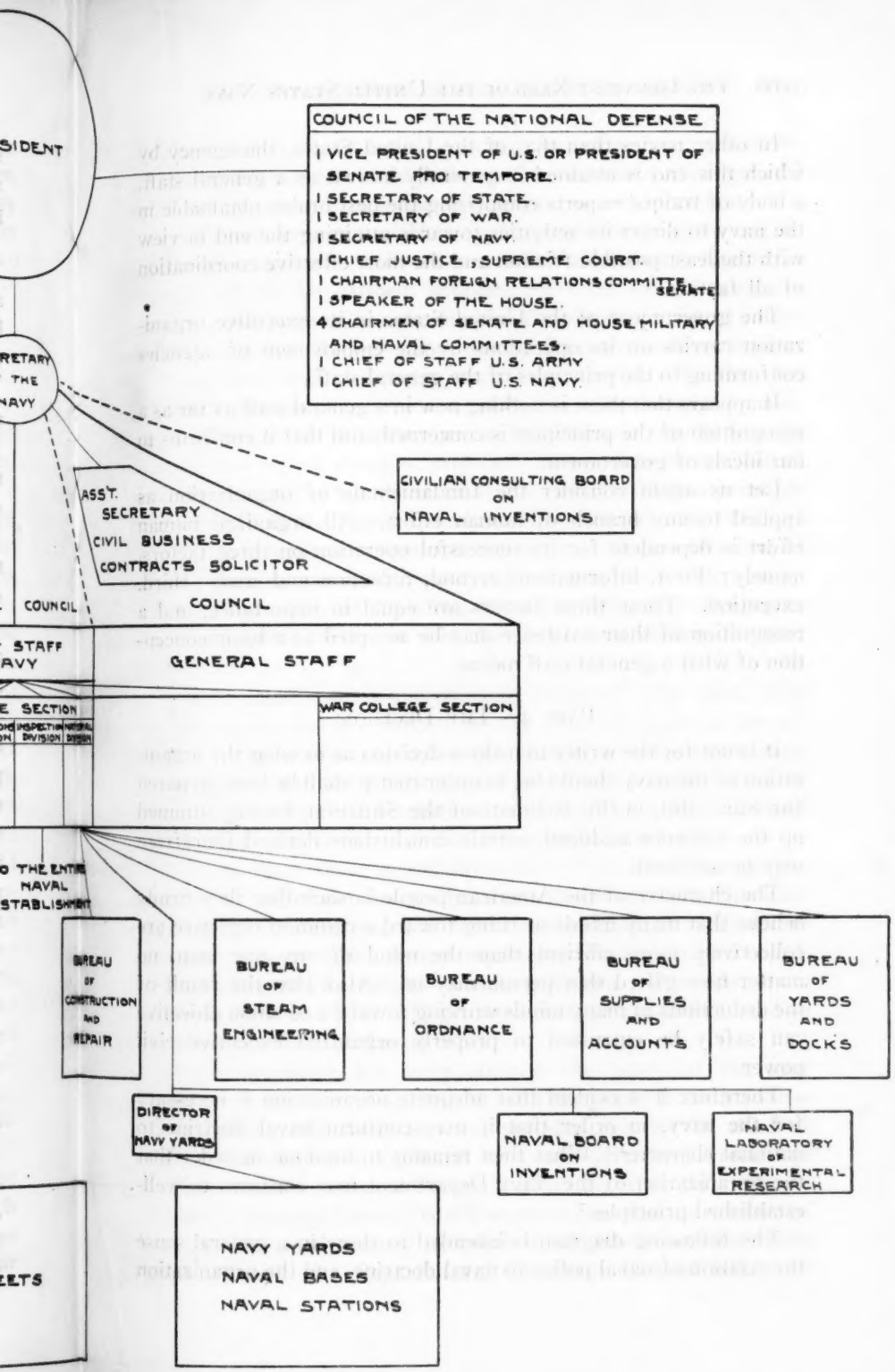
We have seen how there has gradually been evolved, in the Navy Department, an organization which attempts to coordinate all the efforts of the Naval Establishment, beginning with the hydra-headed Bureau System, in which, for want of a better system, all military questions gravitated to one bureau.

To solve the vexed question, the Moody and the Swift Boards made certain definite recommendations, and finally, the Swift Board recommendations were tentatively adopted; but they appear to have been defective, in practice, because there was no responsible head to the organization in a military sense. The Moody Board had recommended that the Aid for Operations should be the senior, but in neither system was there an Aid for War, responsible for the military efficiency of the entire Naval Establishment.

The Navy Department is in receipt of information through its attachés from all the counties of the world to which they are accredited. It is in receipt of information by cable and radio from its commanders-in-chief and commanding officers acting singly, and such information is constantly pouring into the Department in telegrams and radio messages from its various shore establishments. This information has to be sifted and acted upon; sometimes immediate action is imperative, but in every case there must be opportunity for the consideration of the special problem presented and a definite decision must be made as to the course of action to be taken, after which the necessary executive action should be taken with the least possible interference or handicap. There must be some facility for the higher command of the navy to give reflection and study to some of the problems presented. Some problems are solely military in character. Others affect the activities of bureaus of the Department, and others call for consultation with the Department of State in order that the action taken may conform to National Policy. Other problems, such as the military characteristics of ships, and the program of their numbers and distribution by types, and the formulations of plans of campaign, call for reflective study and careful planning before execution can be attempted. What should be the agency which receives this information, digests it, and acts upon it?



PROPOSED ORGANIZATION OF A NAVAL GENERAL STAFF IN ORDER THAT NAVAL
IN CONFORMITY WITH NATIONAL CHARACTER, ALSO SHOWING THE RELATION OF
NATIONAL DEFENCE TO THE NAVY DEPARTMENT.


SIDENT
COUNCIL OF THE NATIONAL DEFENSE
1 VICE PRESIDENT OF U.S. OR PRESIDENT OF SENATE PRO TEMPORE.
1 SECRETARY OF STATE.
1 SECRETARY OF WAR.
1 SECRETARY OF NAVY.
1 CHIEF JUSTICE, SUPREME COURT.
1 CHAIRMAN FOREIGN RELATIONS COMMITTEE, SENATE
1 SPEAKER OF THE HOUSE.
4 CHAIRMEN OF SENATE AND HOUSE MILITARY AND NAVAL COMMITTEES.
1 CHIEF OF STAFF U.S. ARMY
1 CHIEF OF STAFF U.S. NAVY.
RETARY THE NAVY
CIVILIAN CONSULTING BOARD ON NAVAL INVENTIONS
ASS'T. SECRETARY CIVIL BUSINESS CONTRACTS SOLICITOR
COUNCIL
COUNCIL
STAFF AVY
GENERAL STAFF
E SECTION
INSPECTION DIVISION
WAR COLLEGE SECTION
O THE ENTIRE NAVAL STABLISHMENT
BUREAU OF CONSTRUCTION AND REPAIR
BUREAU OF STEAM ENGINEERING
BUREAU OF ORDNANCE
BUREAU OF SUPPLIES AND ACCOUNTS
BUREAU OF YARDS AND DOCKS
DIRECTOR OF NAVY YARDS
NAVAL BOARD ON INVENTIONS
NAVAL LABORATORY OF EXPERIMENTAL RESEARCH
ZETS
NAVY YARDS
NAVAL BASES
NAVAL STATIONS

AFF IN ORDER THAT NAVAL DOCTRINE MAY BE DEVELOPED
HOWING THE RELATION OF THE PROPOSED COUNCIL OF THE

In other navies than that of the United States, the agency by which this end is attained is generally known as a general staff, a body of trained experts comprising the best brains obtainable in the navy to direct its activities towards attaining the end in view with the least possible friction and the most effective coordination of all factors.

The government of the United States in its executive organization carries on its operations by the employment of agencies conforming to the principles of the general staff.

It appears that there is nothing new in a general staff as far as a recognition of the principles is concerned, and that it conforms to our ideals of government.

Let us again consider the fundamentals of organization as applied to any branch of human effort. All organized human effort is dependent for its successful operation on three factors, namely: First, information; second, reflection and study; third, execution. These three factors are equal in importance, and a recognition of their existence may be accepted as a basic conception of what a general staff means.

PART 4. THE DECISION

It is not for the writer to make a decision as to what the organization of the navy should be, in order that it shall be best prepared for war. But, in this Estimate of the Situation, having summed up the evidence adduced, certain conclusions derived therefrom may be set forth.

The character of the American people is such that they firmly believe that many minds working toward a common objective are collectively more efficient than the mind of any one man, no matter how gifted that person may be. Also, that the result of the deductions of many minds working toward a common objective can safely be entrusted to properly organized executive civil power.

Therefore it is evident that adequate organization is necessary for the navy, in order that it may conform naval doctrine to national character. What then remains to be done in order that the organization of the Navy Department may conform to well-established principles?

The following diagram is intended to show in a general sense the relation of naval policy to naval doctrine, and the organization

indicated as necessary to the end that the entire naval establishment may conform to naval policy: It constitutes a naval general staff, and requires recognition of principle, enacted into law.

In order to conform to the basic principles underlying the organization of a general staff we see that the proposed Executive Council of the Department supplies the need for an executive agency. We have still to provide for the proper receipt of information, and for the reflection, study, decision, and consequent planning as a result of the information obtained. We then see that it is necessary to create agencies to fulfil the two remaining requirements. It dawns upon us that there is very little to be done in the way of changes, provided the principle be recognized and accepted. The agents necessary to conform to that principle already exist in the Naval Establishment. We have the Office of Naval Intelligence organized for the receipt and dissemination of official information from abroad, and we can easily organize an office for receiving and sending all radio, cable, and telegraphic communications. This, in fact, has been done during the past year.

Where shall the study and planning be done? The Naval War College exists, and is equipped for the academic study of the art of war. A general board exists and is equipped for the preparation of strategic plans and determination of military characteristics of ships, submarines, and aeroplanes, location of naval bases and all other planning necessary for conformity with naval policy.

We now have three grand divisions: First, for information; second, for reflection and study; third, for execution. For convenience sake, the division of reflection and study is divided into two parts, one of which is now represented by the general board, and which would become the planning section. The other, now represented by the War College, remains as at present devoted to the academic study of the art of war.

If the necessary law were enacted, the heads of the four divisions of the Navy Department, with the heads of the information, planning and study sections, presided over by the chief of staff, would constitute a general staff, and with the Secretary of the Navy and the Assistant Secretary of the Navy would constitute the navy's General Council which would be enabled, as a result of its scientific organization, to conform all naval activities with naval policy. The Departmental Executive Council would be

composed of the Secretary of the Navy, the Assistant Secretary of the Navy, the chief of staff, and the four heads of departmental divisions, personnel, matériel, operations, and inspections.

This council, meeting daily, presided over by the Secretary of the Navy, or in his absence by the Assistant Secretary or the Acting Secretary, *ex officio,* entirely subordinate to that civil officer in matters of policy, would be enabled, with technical skill, to cause naval policy to be carried out by a proper coordination of all the activities of the naval establishment.

The chief of staff, alone, should be responsible by law for the military efficiency of the Naval Establishment, and should be endowed with correlative authority.

There should be one avenue only for communication with the civil power, in reference to matters pertaining to the readiness of the navy for war, and that should be through the chief of staff. As Spenser Wilkinson says, "The essence of good management is unity of direction."

Centralization, however, should be guarded against, and can be prevented by delegation of authority, which is the soul of proper organization, when coupled with sound doctrine.

CONCLUSION

The estimate of the situation is finished. The writer has endeavored to set forth what he considers to be vital defects in our system of naval administration, and the remedy therefor.

The United States Navy is the only large navy in the world which is not administered by a staff system. It cannot be denied that there exists in the public mind a distrust of a general staff, which is our greatest need, and it is probable that laymen do not understand what a general staff is; they regard it as a decorative and comparatively idle body of officers at the seat of power; deriving their views from the composition of the usual governor's staff, in the several states: and, perhaps, a general staff is regarded as a military Moloch, seeking power, instead of what it really is, a body of studious officers, who bring to bear on naval problems the coordinated efforts of the best professional talent available.

A general staff is an aggregation of students, organized with scientific precision, who study the art of war, and lay down principles and systems of procedure to guide the service at large, with sound doctrine.

Napoleon is reputed to have said, when generals failed him, that they did not understand his system. The fault was his, for he went to no pains to teach them.

This vital defect caused the French defeat in 1870-71.

In our own Civil War, general after general was set up in command of the Army of the Potomac, only to be knocked down like a man of straw by the civil power, for the lack of understanding, on the part of statesmen, of the tasks the army had to perform, until finally the President turned the army over to professional soldiers who knew their business, and who were allowed to carry the war to a decisive finish.

But even then they were sadly handicapped for the lack of efficient staffs; in this the Confederates were superior, for their staff organizations had been continuously developed, beginning several months before war was actually declared.

There is a lesson in this for us, at this day.

NOTE.—The following named authorities have been freely consulted in writing the foregoing essay: War and Policy, Spenser Wilkinson; Military Policy of the U. S., Upton; Science of War, Henderson; Letters on Applied Tactics, Griepenkerl; The Economic Aspects of War, Emery; Trained Initiative and Unity of Action: The True Bases of Military Efficiency, Knox; The Estimate of the Situation, Knight; The Estimate of the Situation, Schofield; Various Navy Department Memoranda, especially those of Fiske, Knox, and Madison.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OUR NAVY AND THE WEST INDIAN PIRATES

A DOCUMENTARY HISTORY

By REAR ADMIRAL CASPAR F. GOODRICH, U. S. Navy

INTRODUCTION

Piracy has existed since the beginning of history. It has always been practiced when conditions favored, its requirements being suitable bases from which to operate, an unprotected commerce, and convenient and open markets for the disposal of the plunder. Over a great part of the ocean routes it is no longer to be found—not because the nature of man has changed, but because the conditions, largely through the introduction of steam, have become prohibitory; yet occasional instances are reported, as in Chinese and other Eastern waters, even to-day.

For the purposes of this study, only that form of piracy will be considered which manifested itself in attacks on vessels navigating the seas by other vessels or by armed boats. Many cases of so-called piracy were, in reality, mutiny, although the guilty persons, if convicted, were duly hanged as pirates. Again, a band of ruffians might take passage or secrete themselves on board a vessel and, when opportunity offered, rise, overpower the captain and the crew and take possession of the ship and her cargo. Such occurrences, as well as piratical attacks on vessels under other than the American flag, are not touched upon in these pages.

While the navy of the United States can be shown, from its record, to have done much in the suppression of piracy in the more remote parts of the world, as, for example, in the Mediterranean Sea, in Chinese waters and in the south seas, the present investigations are restricted to acts of piracy, and the action taken by our navy in suppressing them, which occurred in the West Indies or off our own coast.

The reason for this work—and it is well to assign a reason for adding to the already voluminous literature of the naval profession—lies in the fact that, with one exception, this particular chapter of our naval history has never, so far as I know, been dealt with as an isolated subject, having been merged in the general history of the navy. The exception referred to is an article entitled "The Repression of Piracy in the West Indies, 1814-1825," printed in the UNITED STATES NAVAL INSTITUTE PROCEEDINGS for December, 1911. Being written by Captain C. G. Calkins, U. S. Navy, it is, of course, masterly in every way. Dealing as it does with a part of the epoch under consideration here, it offers the particular advantage of presenting the subject from a point of view different from my own.

As far as possible, my information is drawn from contemporaneous publications, chiefly newspapers, and from official documents bearing on the case, with but infrequent drafts upon standard histories. Moreover, the story is told, whenever practicable, in the language of the original accounts, even the spelling being carefully preserved.

The period covered is, roughly speaking, from the adoption of the Constitution of the United States to about 1832. Those who desire to extend their researches over wider limits of time and place can do no better than consult what may be called the "Bible of Piracy," viz.: "The Buccaneers of America," by Esquemeling;[1] "History of the Buccaneers of America," by Captain Burney;[2] and "Privateers and Pirates of the West Indies," by Violet Barbour, in the *American Historical Review* for April, 1911.

A good idea of individuals can be obtained from Charles Johnson's "History of the Pyrates,"[3] and from Frank R. Stockton's "Buccaneers and Pirates of Our Coast," a small book written in his deliciously humorous vein and giving the main facts with which he deals. All these treat of pirates and piracy prior to the American Revolution.

"Captain Brand of the Schooner Centipede," by the late Captain H. A. Wise, U. S. Navy, is thought by many to be the best pirate story ever written. Its plot is laid in the time and localities of this study.

[1] Amsterdam, 1678. English translation reprinted by E. P. Dutton & Co., New York, 1910.

[2] Reprinted from the London edition of 1816 by Macmillan & Co., 1891.

[3] Second edition, London, 1724.

Of piracy in general, a brief summary can be found in the latest edition of the Encyclopædia Britannica, by the competent hand of Mr. David Hannay. To Dr. Gardner W. Allen we are indebted for excellent accounts of the operations of that time in "Our Navy and the Barbary Corsairs," and for graphic descriptions of certain special episodes in West Indian waters, in "Our Naval War with France," by the same writer. The latter book covers a small portion of the period with which we are now concerned. Francis Warriner, in "The Cruise of the Potomac," tells the story of Quallah Battoo from the standpoint of an eye witness.

It is well, at the outset, to understand exactly what piracy is, technically speaking, and what were the methods by which it was carried on.

Sir J. Fitzjames Stephen, in his "Digest of Criminal Law," defines piracy as:

> Taking a ship on the high seas or within the jurisdiction of the Lord High Admiral from the possession or control of those who are lawfully entitled to it and carrying away the ship itself or any of its goods, tackle, apparel or furniture, under circumstances which would have amounted to robbery if the act had been done within the body of an English county.

The Encyclopædia Britannica quotes Sir Thomas Barclay as saying:

> Piracy, being a crime not against any particular state, but against all mankind, may be punished in the competent court of any country where the offender may be found or into which he may be carried. But whilst the practice of nations gives to every one the right to pursue and exterminate pirates without any previous declaration of war (pirates holding no commission or delegated authority from any sovereign state), it is not allowed to kill them without trial except in battle.

Our own statutes on this subject, besides defining the crime itself, prescribe the penalty in case of conviction.

Under the law of the United States, piracy embraces:

(1) The crime of piracy as defined by the law of nations.[4]

(2) The laying violent hands upon his commander, by any seaman, with intent to hinder and prevent his fighting in defence of his vessel or goods entrusted to him.[5]

(3) The commission of the crime of robbery, in or upon any vessel, or upon any ship's company of any vessel, or the lading thereof by any person, upon the high seas, or in any open roadstead, or in any haven, basin or bay, or in any river where the sea ebbs and flows.[6]

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[4] Acts, March 3, 1819; May 15, 1820; January 30, 1823.
[5] Act, April 30, 1790.
[6] Act, May 15, 1820.

(4) The commission of robbery on shore by persons landing from a vessel engaged in any piratical cruise or enterprise, or members of the crew of any piratical vessel.[6]

(5) Commission of murder or robbery (which if committed within the body of a county would be punishable by death under the laws of the United States), upon the high seas, or in any river, harbor, basin or bay out of the jurisdiction of any particular state.[6]

(6) The commission of murder or robbery, or any act of hostility against the United States, or against any citizen thereof, by a citizen under color of any commission from any foreign prince or state, or on pretense of authority from any person.[6]

(7) Every subject or citizen of any foreign state, who is found and taken on the sea making war upon the United States, or cruising against the vessels and property thereof, or of the citizens of the same, contrary to the provisions of any treaty existing between the United States and the state of which offender is a citizen or subject, when by such treaty such acts are declared to be piracy, is guilty of piracy and shall suffer death.[7]

(a) Piracy under the law of nations is a robbery or forcible depredation on the high seas without lawful authority, done *animo furandi*, in the spirit and intention of universal hostility.

(b) A pirate is considered an enemy to the human race and his acts may not only be predicated on the purpose of robbery, but may arise from hatred, animosity, revenge, or mere wanton abuse of power.

(c) Under the Act of March 3, 1819 (U. S. Comp. Stat. 1901, page 2950), to protect the commerce of the United States and punish the crime of piracy, any armed vessel may be seized and brought in, or any vessel, the crew whereof may be armed, and which shall have attempted or committed any piratical aggression, search, restraint, depredation or seizure upon any vessel. The act extends to all armed vessels which commit the unlawful acts specified therein; over all vessels guilty of piratical aggressions upon vessels of the United States or the citizens thereof, or upon any other vessel. (The Marianna Flora, 11 Wheaton 1; The Chapman, 5 Fed. Cas. No. 2602, 4 Sawy. 501.)

(d) The firing by one vessel into another without any previous act of hostility or menace would be a piratical aggression. (9 Op. Atty. Gen. 455.)

(e) It is not necessary that there should be either actual plunder or an intent to plunder; if the act be committed from hatred or an abuse of power, or a spirit of mischief, it is sufficient. (U. S. *vs.* the Malek Adhel,[8] 2 Howard 210.)

(f) A piratical aggression, search, restraint, or seizure is as much within the act as a piratical depredation.

(g) Under this act, with its supplement of August 5, 1861, it is not necessary that the vessel, in order to be liable to seizure, should have been fitted

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[7] Act, March 3, 1847.

[8] Taken by the U. S. S. *Enterprise*, Lieut. L. M. Goldsborough, off Bahia, September, 1840.

out by American citizens, or in American ports, nor that the intended aggressions should be upon American vessels. (The Chapman, 5 Fed. Cas. 2602, 4 Sawy. 501.)

(h) Piracy is usually committed under the flag of some known government; but the crew of any vessel committing it thereby casts off its national character; and so the guilty persons, though the acknowledged subjects of some known government, may be apprehended and punished by the authorities of any nation.

U. S. *vs.* Pirates, 5 Wheaton 154; Adams *vs.* The People, 1 Coms. 173; The Marianna Flora, 11 Wheaton 1, 40; U. S. *vs.* Gilbert, 2 Sumner 19; 4 Bl. Comm. 71; U. S. *vs.* Demarchi, 5 Blatchford 84; Wheat. International Law 185, 6th ed.; Dole *vs.* N. Eng. Ins. Co., 2 Cliff. 394, *in re* Ternan, 9 Cox C. C. 522; Atty. Gen. *vs.* Kwok-a-Sing, 8 Eng. R. 143.

(i) A vessel loses her national character by assuming a piratical character; and a piracy committed by a foreigner from on board such a vessel upon any other vessel whatever is punishable under Sec. 8 of the Act of April 30, 1790. (U. S. *vs.* Pirates, 5 Wheaton 184; U. S. *vs.* Gilbert, 2 Sumner 19.) [9]

To complete the list of crimes which our law pronounced to be piracy, it is well to add, although not exactly pertinent to our inquiry, that persons engaged in the slave trade were by statute declared to be pirates. Heavy punishment was also decreed to persons aiding and abetting pirates.

Convicted pirates were, by earlier statutes, condemned to death, but in 1897 Congress changed this to imprisonment for life. It would be interesting to learn the reason for this questionable act of clemency towards ruffians who deserved the worst of fates.

From countless sources, mostly fictional, a harrowing picture has been derived of the appearance and behavior of these ruffians, which will survive for all time. Ugly of countenance, heavily bearded, hawk-like features, piercing black eyes, long black locks, high boots with trousers stuck into them, a broad scarlet sash over velvet garments, the spoil of some wealthy victim, carrying a whole arsenal of daggers and pistols on the person—such is the pirate in his conventional stage setting. I have no desire to challenge or destroy this popular conception, although, were the facts known, the pirates would doubtless have been often found scantily clad and even ill provided with weapons other than knives.

"Walking the plank" is seldom, if ever, mentioned in authentic reports of their treatment of captives; nor were they always so

[9] *Vide* also Stockton's "Outlines of International Law," pp. 78, 79, 154, 155. And Report of the Committee on Foreign Relations to the House of Representatives, quoted in this manuscript under the year 1825.

bloodthirsty as represented. Cruel they were, but their cruelty had, generally, for its object the extorting of a confession as to the whereabouts of concealed money, for this, with jewels, was primarily the subject of their quest. Occasionally, indeed rarely, vessels which had fallen into their hands were released after yielding up their treasure; more often, however, the ships were carried into an obscure port and their cargoes sold to merchants and others who rejoiced in an opportunity to acquire goods at an absurdly low rate.

As will be perceived later on, this business, on a large scale, was only possible through the connivance of the local authorities, a circumstance which made its suppression extremely difficult and, incidentally, at times threatened to affect unfavorably the friendly relations existing between the United States and Spain.

To show the depths of brutality to which the pirates on occasion could descend, a few pertinent instances are quoted, out of the large number available. A letter received at Charleston, from a gentleman at Matanzas, dated 27th September, 1821, says:

> Three horrible events have just taken place. Three American vessels—two of them coming in, viz., the brig *John Smith*, and the schooner *Milo*, of Bristol; the other the sloop *Collector*, of Rhode Island, bound out—*have been captured at the entrance of this harbor by a launch fitted out here!* and manned by nine villains, viz., one Portuguese, six Spaniards and two Englishmen. They killed the captain and two men of the schooner and then ordered her to the northward; *they murdered all the crew of the brig, opened their entrails, hanged them by the ribs to the masts, and afterwards set fire to the vessel and all were consumed!* The sloop was more fortunate: the pirates contented themselves with severely beating the crew and plundering her of the most valuable articles on board—they then collected the combustibles and set them on fire and left her, hoping, as in the case of the brig, to consume the vessel and crew together, but these last, fortunately, had strength sufficient to take to her long boat, and have safely got back to Matanzas.
>
> On their arrival, they applied to the governor for protection, and after some delay, he allowed the Americans in the place to arm in pursuit of the pirates. Three boats full set out in quest of them, and after a cruise of 36 hours, have just returned without success.[10]
>
> We are becoming disgusted by feeling bound to notice the doings of the wretched men who infest the coasts of Cuba, especially in the neighborhood of Cape Antonio.[11] The brig *Hannah*, of Philadelphia, has been plundered of 460 bags of coffee, $5000 worth of tortoise shell, and $1000 in specie. The crew were most horribly treated—the captain, his brother and five

[10] N, October 29, 1821.

[11] Cape San Antonio.

passengers, were nearly roasted to death, to make them confess that money was on board, by building a large fire around them, they being tied; they were also nearly killed by being beaten with swords! These pirates rendezvous at a place called Feureas,[12] 30 or 40 miles to windward of Cape Antonio. They have daily communications with Havana, which is the market for their spoils.

We hear of several cases every week, like those noticed above.

Our cruisers in these seas do not appear to want activity—but the pirates, keeping close to the coast, have so many hiding places in shoal water, that it is almost impossible to get at them.[13]

Commodore David Porter, writing to the Secretary of the Navy from Matanzas, under date of March 28, 1823, says:

Since my arrival here I have heard of the most horrid atrocities committed by them (pirates). They now spare no one; whole ships' crews are indiscriminatingly burnt with their vessels, and there has been an instance recently of the murder of a crew under the walls of the Moro.[14]

The brig *Bellisarius*, of Kennebunk, has arrived at the Balize, for New Orleans. When on her voyage from Port au Prince for Campeachy, she was boarded off the harbor of the latter by a piratical schooner, of about 40 tons, and manned by 30 or 40 men, who asked for money, but the captain (Perkins) denied having any. They then stabbed him in several places and cut off one of his arms, when he told them where the money was (200 doubloons), which they took, and proceeded to murder him in the most inhuman manner. He was first deprived of the other arm and one of his legs. They then dipped oakum in oil, put some in his mouth and under him—set it on fire, and thus terminated his sufferings! The mate was stabbed with a sabre in the thigh. They also robbed the brig of anchors and cables, sails, rigging, quadrants, charts, books, papers, and nearly all the provisions and water. On the passage from Campeachy to the Balize she was providentially supplied with provisions, etc., by several vessels which she fell in with, or her people must inevitably have perished.[15]

Mr. Mountain, acting consul of the United States at Havana, to Mr. Warner, the consul:

HAVANA, October 30, 1824.

The following is an extract of a letter from Mr. Lattin, with whom you are acquainted, dated:

MATANZAS, 27th October, 1824.

I am sorry to say the pirates have committed the most horrid depredations last Thursday and Friday between this and your port. The *Laura Ann*, of New York, belonging to Griswold, of that place, from Montevideo, with a cargo of jerked beef, was taken, all the crew except one hung, the vessel set on fire, when Jack, who had hid away among the beef, crawled out, jumped overboard, and got ashore.[16]

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[12] Not identified. [13] N, October 19, 1822. [14] N, April 12, 1823.
[15] N, April 12, 1823. [16] FR, V, 498.

A newspaper gives us the following:

We have a horrible account of a piracy committed on the brig *Attentive*, Capt. Crozer, of Boston, a few hours' sail from Matanzas, on her way home, and of the probable murder of all the crew except one man, the 2d mate, who concealed himself. The narrative is thus given by this person, Alfred Hill, before the U. S. commercial agent at Matanzas, on oath.

After describing the sailing of the vessel on Feb. 22, and the crew, consisting of the captain, 2 mates, 3 seamen and a cook, he says: "Off point Yacos, was boarded and brought to by a piratical schooner, of about 60 or 70 tons burthen, full of men, armed with cutlasses, and having two large guns, who ordered the boat to be lowered and sent on board of the schooner, which was done, having on board Capt. Crozer and two men, Joseph Blanday and John Robinson; that as soon as the boat got alongside of the schooner, a number of men jumped on board, took out the two seamen, and immediately shoved alongside the brig and boarded her, and ordered all hands, except the captain, into the fore peak; after shutting the scuttle over, they waited about 10 minutes, and ordered all hands on deck again; that at this time, he, the said Alfred Hill, was stowed away amongst the cargo for the purpose of secreting himself; that the crew were called on deck separately; that he then heard a heavy groan from the captain, and heard him distinctly repeat these words, 'Lord, have mercy on my soul!' and heard a scuffling on deck, and groans of the people; that after the noise had ceased, they commenced searching, as he supposed, for money, that about 4 o'clock, in the afternoon, they knocked out her bow port, when she immediately began to fill with water. Hearing a noise on deck at the time, he supposed that the pirates had not left her, and was afraid to go upon deck: that having discovered the noise to proceed from the flapping of the sails, after having remained below until twilight, he went upon deck, and got some blankets, with which he endeavored to stop up the bow port, but found it no use, as the force of the sea washed them in again; that he then filled the topsails, to endeavor, if possible, to get her back into the harbor; that about three miles and a half from the shore she sunk."[17]

It would not be fair to the gentlemen of the Jolly Roger to assert that the cases just cited are wholly typical. Rather do they illustrate the extreme of their brutality. Nevertheless, the fate of these unfortunate victims was that which might be expected by others under like circumstances. There is hardly a capture of which the report does not charge the pirates with cruelty, fiendish torture or murder. Surely, a sea life in those days was not without its thrill of expectation, and too often of realization.[18]

Tradition has always painted a long, low, rakish-looking schooner, painted black and flying either a red flag or the cus-

[17] N, March 21, 1829.

[18] *Vide* log of the *Aurilla*, Capt. Wing Howland, in N July 15, 1822.

tomary skull and crossbones on a black ground. Escape by flight, unless aided by darkness, was generally hopeless because of superior speed on the part of the piratical schooner, due not so much to her lines as to the slowness of the prey occasioned by deep draft through heavy loading. As will be frequently seen in the following pages, a favorite and effective form of piracy was the attack on vessels becalmed by armed men putting off from shore in boats or barges.

It seems remarkable that so few cases of resistance are on record. Some there be, however, which deserve mention as a tribute to the brave sailors who preferred, if they had to perish, to die fighting. The imagination must fill in the outlines of the following brief notice:

August, 1821, schooner *Evergreen*, Isaac Pool, captain, of Edgecomb, Maine, was captured by a piratical vessel; soon thereafter the captain retook his schooner and made prisoners of the prize crew; arrived in Boston, Mass., on September 22, 1821.[19]

Under the caption, "A Desperate Fight," was printed the following:

The brig *Patriot*, of New York, Horace T. Jacobs, master, on her voyage from Port au Prince to New Orleans, on the 7th of September, being off Cape Antonio,[20] and in a dead calm, was attacked by a piratical schooner of about 60 tons, with a crew of from 45 to 50 men. After noticing the approach of the enemy, we find the following account of the engagement in a New Orleans paper: "Capt. Jacobs then tacked to the south and eastward and hauled up the course, and ordered preparations to be made for action, which were readily and unanimously obeyed; the universal good spirits which pervaded all hands (consisting of 10 men and a boy) were truly conspicuous. When the schooner was close under the stern, Capt. Jacobs hailed her, upon which she fired a whole volley of musketry into the brig—and we in return commenced upon the schooner by firing the stern gun, which was under the direction of Mr. Johnson, the chief mate, which, with the musketry, did great execution amongst them. This gun was, however, dismounted the third round, and our colors were shot away at the same time, upon which the schooner set up a terrible shout to board from the bowsprit end—her boarders were covered by an abundance of musketry, but notwithstanding their vast superiority they were very gallantly repulsed. She then set fire to the brig astern, by throwing fired wads in at the cabin windows and into the stern boat, which was happily extinguished without damage. She then made another attempt to board, but was equally unsuccessful. By this time her fire considerably abated, and we could perceive an almost clear deck on board of her, and that she manifested a willingness

[19] PG, Oct. 7, 1821.
[20] Cape San Antonio.

to get clear of us. She asked for quarter repeatedly, but it was suspected to be a trick (and regarded as such), to get a sight of the people and knock them off. She had much difficulty in getting clear of the brig, as her jib-boom and some of her ropes forward had got foul of the brig's davit and the stern boat's bow. Seven men could only be counted on her deck with the glass when she was a half mile off. The brig's rigging and sails are very much cut up; Capt. Jacobs was wounded in the head by a musket ball and is supposed to have fractured his skull. He died of a lockjaw and violent convulsive fits on the night of the 12th inst. He has left a wife, who was on board in the action, to lament his loss; he had only been married a little more than three months. Mr. Johnson, chief mate, to whom reference has already been made, is the only surviving officer of the brig, and was wounded in the thigh by a musket ball; he is much to be praised for his good and persevering conduct. Mr. J. D. Walker, of New York, doing second mate's duty, was killed in the action."

The following persons, comprising the crew of the said brig, to wit: Robert Greenoh, Thomas Stanley, Robert Mins, Henry Wilson, alias John Cotton, Henry Brown, Wm. Brown and Jerry Dedon, are deserving of every encouragement for their intrepid conduct against so unequal a force, as well as their dutiful obedience throughout to Mr. Johnson, in bringing the brig hither.[21]

A still better piece of work is thus described:

The brig *Bowdoin*, Captain Carr, has arrived at Newport, R. I., from Matanzas. Four hours after leaving the latter, Captain C. was approached by a piratical schooner from the land and full of men, rowing fourteen sweeps. On coming up, they hoisted the red flag, and called upon Captain C. to ***strike or die***. He was not quite willing to do either, but waited until the scoundrels arrived within range, when he let loose at them four carriage guns and a number of muskets. The deck of the schooner was completely raked, and she instantly hauled off with all possible speed, rowing, however, only *three* sweeps instead of 14. Captain C. supposes that he might easily have sunk the pirates, had it not been calm, which enabled them to escape.[22]

It is to be regretted that such gallant resistance was the exception, rather than the rule. Our government, when asked that merchant vessels be ordered to arm for self-defence, declined to do so but replied to the effect that there was no law against it. Rather a frigid encouragement, it must have appeared, to those vitally interested.

Official action, in a restricted sense, was taken in the Act of Congress of June 25, 1798, which authorized merchant vessels purely on the defensive to "repel by force any assault" committed upon them by French cruisers or privateers, capture the

[21] N, November 2, 1822.
[22] N, March 8, 1823.

aggressors, and recapture American vessels taken by the French, while that of July 9, the same year, provided for the issuing letters of marque against the French.[23]

There were many sporadic cases of piracy in the West Indies all through the period under discussion, but twice, owing to special causes, the depredations on American shipping became epidemic, rather, however, as the consequence of disturbed international relations than of the active pursuit of piracy itself.

During the maritime war between Great Britain and France, from 1793 to 1815, many of our vessels were seized on various pretexts, either by belligerents or by privateers fitted out under French and British flags. Such a state of affairs very naturally created the opportunity for individual efforts, with or without legitimate authority, which practically amounted to piracy in a great number of instances.

Our so-called naval war with France, at the close of the 18th century, afforded excellent opportunity for assaults on American commerce, not only by French privateers, but by pirates as well, opportunities that were largely and indiscriminately utilized.

Again, in the early part of the 19th century, after the various Central and South American republics had declared their independence of Spain, the latter country proclaimed a blockade of all such coasts and enforced it against neutral vessels without mercy, and, indeed, without right. In this period, piracy again flourished, reaching a culmination in the early twenties of that century, after which time, largely through the efforts of the United States Navy, it gradually decreased in volume and disappeared save in a few exceptional cases.

It follows, as a matter of course, that the study of this subject will pass rather rapidly over the opening phases of these operations on the part of our navy, but will necessarily have to deal in greater detail as the years go by and until the causes for these activities diminish to practically nil.

1791-1809

One of the earliest cases of piracy during the period we are considering is that of the *Polly,* of Baltimore, David Porter, master. The schooner touched on a reef at Cat Island, but managed to get off and to make her way to a port on the north side of

[23] NWF, 58.

Cuba for repairs. On December 8, 1791, she was about to proceed "when a small Spanish schooner, having five men on board, came down and anchored alongside, close to us. Three of her people came alongside and asked for an axe to cut some wood with to put under their hides, which I gave them, and inadvertently permitted them to come on board. After asking some questions and their telling a pitiful story of being taken by a Guarda Costa a little while before, all of a sudden, hangers, pistols, and knives were drawn by them. One of my men was knocked down by the axe which they had borrowed, another drove overboard and a third escaped by getting into the hold. I was cut in several places of my jacket in endeavoring to escape; at last I surrendered and begged my life which was given with seeming reluctance. . . . . They drove us over into the boat with six pieces of meat, a small keg of bread and no water." The party ranged along the coast until they met a sloop from New Providence. "Some people in a Spanish launch advised me by no means to go to the town (Puerto Principe), as I would certainly be murdered that a claim might be prevented."[24]

After the outbreak of hostilities between France and Great Britain in 1793, insolence and violence to American vessels and crews by British and French privateers became humiliatingly frequent. Craft that fell into their hands might almost as well, so far as treatment was concerned, have been captured by pirates. The men-of-war, as a rule, were more considerate.

At this time it was very difficult to draw the line between privateers and pirates, and therefore reported cases of piracy may have sometimes fallen under the category of legitimate or quasi-legitimate captures.

In 1793, so far as the files of the Philadelphia *Commercial Advertiser* are concerned, but two instances of piracy have been found recorded. The brig *William,* Captain Prince, which left Port au Prince November 1, for Salem, was boarded the following day by Spanish pirates, who "robbed the vessel and passengers of everything valuable and handy." A similar fate befell the schooner *Port au Prince,* of Baltimore, about the same time.[25]

In 1794, no piracies, strictly speaking, are found reported in the files of the newspapers of that time, but American vessels are taken by cruisers and privateers of the belligerents everywhere and on all

[24] PA, March 12, 1792.
[25] PA, December, 1793.

pretexts. It is possible that there were too many vessels of war about to make it prudent for real pirates to engage in their operations. Complaint was made almost daily of the annoyances to which American commerce was subjected by privateers of all parties.

In 1795, again we read that American vessels were taken indifferently by French and Spanish and British privateers. They were practically always condemned, their cargoes being declared the enemy's, no matter what were the facts. In the press of that year, frequent stories are printed describing the grievous treatment of their crews at the hands of the captors. This alone would seem to indicate that most of the depredations were committed by privateers, or vessels purporting to be privateers.

There seems to have been no very good *raison d'être* for pirates in those days, as the nefarious trade could be carried on with quite as much success and far greater safety under a belligerent flag.

In 1796, the merry game continued, and literally hundreds of American ships were taken. One that first fell into French and then into British hands, or *vice versa*, was sure to be plucked pretty clean. In addition, officers and crew were generally beaten and maltreated.

There arrived in Baltimore, February 10, 1797, "the ship *Juliana*, Captain Hayward, from Hamburg, but last from Porto Rico, into which port she was carried, after being within two days' sail of Cape Henry, by a French privateer and detained several days. It luckily happened that the privateer had no commission and the *Juliana* was suffered to depart without further detention."[26] Technically, the captor was a pirate.

One vexatious feature of these captures was common to perhaps the majority. It is illustrated in the case of the *Juliana*, which, although allowed to go free, was ordered by the French Prize Court to pay all expenses!

The dreary catalogue of these offences is occasionally enlivened, as in the case of the ship *Ruby*, taken on January 27, 1797, by a French privateer. A prize crew, a master and eight men, were put on board and the ship was ordered to San Domingo. Captain Smith and five of his men seized the prize crew on February 1, recaptured the ship and sent the scoundrels off in a small boat to San Domingo.[27]

[26] PA, February 17, 1797.
[27] PG, February 27, 1797; PA, March 1, 1797.

Also the schooner *Mary*, Hackett, master, from Philadelphia to Pensacola, taken in this way about this time, was also recaptured by her crew.

It is interesting, however humiliating, to note that in the newspapers of that epoch consulted, there is a marked absence of editorial strictures on these matters. Apparently, such losses, and the indignities accompanying them, were of so frequent occurrence as to have been quite universally regarded as all in the day's work. The seafaring community, so it would appear, accepted and recognized the existence of these risks and was prepared to abide the consequences when unfortunate enough to become a prize.

The melancholy story continues in the following year of 1798. Whether the case be typical or not, it is hard to say, but the facts speak volumes for themselves. An American ship, taken by a French privateer, retaken by a British privateer, was sold to cover the salvage! Surely, the lot of the seaman then was not a happy one.

It will be remembered that the quasi war with France broke out about this time through the abrogation by Congress on July 7, 1798, of the treaties and conventions between the United States and France following the latter's predatory warfare on American commerce. The following vessels were ordered into West Indian waters: *United States*, 44; *Constitution*, 44; *Constellation*, 36; *George Washington*, 32; *Merrimack*, 24; *Ganges*, 24; *Delaware*, 24; *Baltimore*, 22; *Montezuma*, 22; *Herald*, 18; *Pickering*, 16; *Norfolk*, 18; *Richmond*, 16; and seven revenue cutters.[28]

Very few, if any American ships were captured in the early part of this year by the French, and only an occasional one by the British. It was remarked at the time that our activity in the West Indies largely helped to protect British commerce. On the coming of summer it is probable that our fleet left those waters and returned north since we read that the "French of Guadaloupe are making many captures of American vessels."[29]

The disturbed state of affairs in Hayti at the close of the eighteenth and the opening of the nineteenth century, due to the revolt of Toussaint l'Ouverture, vitally affected our commerce in adjacent waters.

[28] PA, which obtained its news from a letter dated New London, Jan. 2, 1799. *Vide* also C, I, 249.

[29] PA, in its New York letter of July 3, 1799.

The authority of Toussaint in San Domingo was disputed by the mulatto chieftain Rigaud, who held the southwestern part of the island, except Port Republicain,[20] with the small island of Gonaive. He carried on actively a piratical form of warfare in the waters of that region. In the Gulf of Gonaive, then known as the Bight of Leogane, the vessels employed were large barges manned by crews of about 40 men and armed with two or three swivels. They would lie in wait for their prey by the shore, and when unsuspecting vessels appeared would put out from their hiding places and attack them. When becalmed, vessels even of considerable force had little chance of escape. They were taken by their captors into one of the ports controlled by Rigaud, their crews having generally been murdered. Trade with Port Republician was beset with difficulty and danger through the operations of these picaroons.[21]

An early report of a sharp affair in this locality is the following:

The following information is given by Captain Boden, arrived at Baltimore on the 6th inst. from Cape François, which place he left the 15th ult.: "The U. S. schooner *Experiment*, Captain Maley, with a convoy off the east end of Gonaives, in the Bight of Leogane, was attacked about the 10th of January, by 12 of Rigaud's barges; during the action, 3 of them went on shore and renewed their crew; the day being calm, they had every advantage of the schooner, but after she had sunk three of them, the remainder sheered off: they however took possession of a northern brig, Captain Chipman, *whom they instantly murdered*—part of the crew saved themselves by jumping overboard. She was afterwards retaken by one of Toussaint's barges. Dr. Stephens[22] was on board the *Experiment* at the time of the engagement."[23]

Cooper's account of this affair is in these words:

The *Experiment*, 12, made her first cruise under the command of Lieutenant Commandant Maley, and was much employed in convoying through the narrow passages, where the vessels were exposed to attacks from large barges manned from the shores. About the close of the year 1799, or at the commencement of 1800, this schooner was becalmed in the Bight of Leogane, with several sail of American merchantmen in company and under convoy. While the little fleet lay in this helpless condition, a good deal scattered, 10 of the barges mentioned, filled with negroes and mulattoes, came out against it. The barges contained from 30 to 40 men each, who were armed with muskets, cutlasses, and pikes, and in some of the boats were light guns and swivels. As the *Experiment* was partially disguised, the enemy came with reach of her grape before the assault was made, when Lieutenant Commandant Maley ran out his guns and opened his fire. This was the commencement of a long conflict, in which the barges were

[20] Port au Prince.
[21] NWF, 115.
[22] American Consul General.
[23] PA, February 13, 1800. Also, COL, February 19, 1800.

beaten off. It was not in the power of the *Experiment*, however, to prevent the enemy from seizing two of her convoy, which had drifted to such a distance as to be beyond protection. A third vessel was also boarded, but from her the brigands were driven by grape, though not until they had murdered her master and plundered the cabin.

The barges went twice to the shore, landed their killed and wounded, and took on board reinforcements of men. The second attack they made was directed especially at the *Experiment*, there being no less than three divisions of the enemy, each of which contained three heavy barges. But, after a protracted engagement, which, with the intermissions, lasted seven hours, the enemy abandoned further designs on this convoy, and retreated in disorder. The *Experiment* endeavored to follow, by means of her sweeps, but finding that some of the more distant barges threatened two of her convoy, that had drifted out of gunshot, she was obliged to give up the chase.

In this arduous and protracted engagement the *Experiment* was fought with spirit, and handled with skill. The total absence of wind gave the enemy every advantage; but notwithstanding their vast superiority in numbers, they did not dare to close. Two of the barges were sunk, and their loss in killed and wounded was known to have been heavy, while the *Experiment* had but two wounded, one of whom was Lieutenant David Porter.[34]

The episode just described is worthy of note because, notwithstanding Cooper's expressions, Maley is believed to have acted discreditably. Indeed, Admiral Porter, in the memoir of his father, states that Maley "spoke of surrendering"[35] to superior force and that he actually turned the command of the *Experiment* over to his first lieutenant—Porter.

Lieutenant Porter was unanimously applauded for the determined stand he took against the weakness of his commanding officer. This case shows the necessity of firmness in time of danger; and of not yielding until forced by superior numbers to do so. . . . . One of the officers of the *Experiment*, Joshua Blake, writing to Commodore Porter nearly 40 years after the affair, uses this language: "At that time and ever since I considered the safety of the vessel and the honor of the flag mainly to have depended on yourself, and that our situation would have been desperate indeed, had you been so disabled as to have been off duty."[36]

To our cruisers in the West Indies at this time was assigned the duty of convoying American merchant vessels. This service, seen in the case of the *Experiment*, is further shown, by an extract from a letter to Captain George Little of the Frigate *Boston*,

[34] C, I, 286-7. Also, AB, 404; E, 53; M, I, 205; CDP, 29-31.
[35] CDP, 30.
[36] CDP, 32.

addressed to him by Commodore Silas Talbot, the local commander-in-chief, to have been regulated under authority:

U. S. Frigate *Constitution*,
1 March, 1800.

Sir:

.....

Ten days after the receipt of this letter you will appear off Cape Nich's Mole[37] and send your boat in to inform all American vessels (if any are there) that you are off the harbor and ready to take under convoy all such as are bound up to Port Republic, etc. And you must continue in like manner to appear off the Mole St. Nicholas every 14 days to convoy all such American vessels as may be bound up the bite; and also every 14 days to sail from Port Republic with such convoy as may choose to profit by your protection. When it is generally known in the United States, as I presume it will be soon, that this arrangement is made, it is likely that our merchant vessels will stop at the Mole and then wait a convoy up the bay.[38]

Frequent seizures by French privateers were recorded in the newspapers during this period, but it was the "picaroons" who were responsible for the following terse entry in the log book of the *Boston* while Captain Little was carrying out Talbot's orders:

March 11, at 4 p. m., saw 9 barges, full of men, from Gonaives, decoyed them by running in the guns; when within shot, a fire commenced which continued 5 glasses—disenabled 5 of them, when the others made off.[39]

Cooper describes this action at greater length:

In March, the *Boston*, 28, Captain Little, being near the Point of St. Mark's, having a merchant brig in tow, on her way to Port au Prince, nine barges were discovered pulling towards the vessels, coming from the small island of Gonaives, with every appearance of hostile intentions. The barges were large, as usual, pulled 20 oars, and contained from 30 to 40 men each. As soon as their characters were properly made out, the guns of the *Boston* were housed, and the ship was otherwise disguised. This strategem succeeded so far as to draw the barges within gunshot; but discovering their mistake before they got as near as could be wished, they turned and began to retreat. The *Boston* now cast off her tow, made sail in chase, ran out her guns and opened her fire. For two hours, she was enabled to keep some of the barges within reach of her shot, and three of them, with all their crews, were sunk. The remainder did not escape without receiving more or less injury.[40]

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[37] Mole St. Nicholas.

[38] From original letter in possession of Assistant Secretary of the Navy Franklin D. Roosevelt.

[39] COL, July 19, 1800. Note.—Time was kept by a sand glass which ran thirty minutes. Thus five "glasses" meant two and a half hours.

[40] C, I, 284; also, E, 50; M, I, 208.

It was reported late in the year 1800 that the *Experiment*, under command of Lieutenant Charles Stewart, captured *La Diana* with "General Rigaud," the leader of the picaroons, on board.[41]

Public attention in external affairs during the years 1801 and 1802 was mainly devoted to our navy's work against the Tripolitan Corsairs. In comparison with the latter, the West Indian pirates seemed as pigmies to giants. None the less, as pigmies can and do use poisoned darts, so the pirates, masking as privateers, were not wholly idle, as one can see from the following:

The *Golden Grove*, from Porto Rico. She is a prize from the English. Mr. Joel Bradford (late mate of the schooner *Polly*, of Providence) came out in the *Golden Grove*. He informs us that the schooner *Polly*, bound from this port for St. Thomas, was captured on the 7th of August by a row boat mounting one swivel, under Spanish colors, and manned with 20 Frenchmen armed with knives. The *Polly* was carried into a small uninhabitated place in the island of Porto Rico, and after the most barbarous and inhuman treatment, the crew were sent off without a cent of money. As a pretext for the condemnation of the *Polly* (which took place on the 30th of August), these piratical scoundrels swore in the most bitter manner that if the supercargo (John O. W. Carpenter) did not swear he was an Englishman, and that the property was English, they would cut his throat —to save his life, this oath was taken and the vessel condemned. The property, however, was *bona fide* American. Mr. Bradford further informs that he left at Porto Rico the schooner *Two Sisters*, Eatem, and sloop *Two Brothers*, Bliss, belonging to Philadelphia, waiting for new trials, on oaths which had been obtained as above stated. In the *Golden Grove* came six of the crew of the ship *Zenobia*, captured three days after she sailed from this port. The *Zenobia* was ordered for Porto Rico, but had not arrived when the *Golden Grove* sailed.[42]

Restraints on American commerce, such as the foregoing, were almost as intolerable as piracy itself, from which it is difficult to distinguish them. While, happily, lacking in bloodshed, they did not fail to annoy. What could have been more vexatious than the "squeezing" mentioned in the notice:

NEW YORK, Feb. 11.—Brig *Washington*, Renegon, from Havana, left about 30 sail of American vessels. He informs that a number of American vessels had been sold there at liberal prices. Captain R. also informs that American vessels are occasionally permitted to enter the port of Havana, and, to use his own words, this is not done without previously greasing the hands of the Spaniards.[43]

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[41] COL, November 1, 1800.
[42] PG, October 24, 1801.
[43] PG, February 12, 1802.

That a little resistance and firmness on the part of our captains would have proved salutary, is gathered from the following item:

CHARLESTON, Nov. 13.—Arrived on the 11th instant, from the Havana, the brig *Exchange*, John Mainwaring, master, who sailed the 21st Oct., with one Spanish passenger on board, and on the 25th was boarded by a Spanish schooner, who took possession of the brig and ordered her for Metanzes, but the captain of the schooner finding Captain M. determined to apprehend him, abandoned the brig, and made sail for the Havana.[44]

There was a temporary lull in affairs, as between Great Britain and France, after the Peace of Amiens in 1802, but, on the breaking out again of war in 1803, the seizures of American vessels began afresh. Many privateers were about whose crews are reported to have behaved as badly as any pirates.

NEW YORK, Aug. 19.—At quarantine, schooner *Diana*, Cape François 15. A letter by her mentions that an American vessel has been captured by the brigands. They gave the crew the boat, who had arrived at the cape.[45]

The specific instances of actual piracy during this and the next few succeeding years are comparatively infrequent, most of this work being done by privateers. A few, however, on record are mentioned in their order:

The *Success*, Twycross, arr. Boston March 31, 54 days from Kingston. Brought to anchor under Cape Antonio on the 11th Feb. by a pirate, a boat of about 15 tons, 1 6 pd., manned with 20 men, mostly Spaniards. They plundered the *Success* of $1200, all the clothing that was worth taking, rigging and sails to the amount of $600.[46]

The newspapers of 1805 report many privateers hovering off our ports and seizing American vessels. Doubtless, not a few of these so-called privateers were, in fact, pirates. One wonders why our government did not send out cruisers, overhaul them, and make them show their letters of marque or other papers of authorization. A slight ray of hope is perceived in the statement that on the 30th of August of that year the frigate *Adams*, Murray commanding, sailed on a cruise, rumor reporting that "his limits are to be within three leagues of our coast and for the purpose of releasing any American vessels unlawfully taken." This falls very short of what would appear to have been the government's duty. The reading of such spoliations is by no means pleasant, making, as it does, the blood boil even to-day over the injuries and insults inflicted by these sea robbers, legitimate or otherwise.

[44] PG, November 25, 1802.
[45] PG, August 20, 1803.
[46] PG, April 6, 1804.

The French were admittedly the worse in their behavior, but the British cannot be entirely acquitted of brutality on their part.

The situation is officially made clear in President Jefferson's Fifth Annual Message to Congress, December 3, 1805, as follows:

Since our last meeting the aspect of our foreign relations has considerably changed. Our coasts have been infested and our harbors watched by private armed vessels, some of them without commission, some with illegal commissions, others with those of legal form, but committing piratical acts beyond the authority of those commissions. They have captured, in the very entrance of our harbors as well as on the high seas, not only the vessels of our friends coming to trade with us, but our own also. They have carried them off under pretense of legal adjudication; but not daring to approach a court of justice, they have plundered and sunk them by the way, or in obscure places, where no evidence could arise against them; maltreated the crews, and abandoned them in boats in the open sea, or on desert shores, without food or covering. These enormities appearing to be unreached by any control of their sovereigns, I found it necessary to equip a force to cruise within our own seas, to arrest all vessels of these descriptions found hovering on our coasts, within the limits of the Gulf Stream, and to bring the offenders in for trial as pirates."

The New York *Evening Post*, at the close of 1805 and the beginning of 1806, published a series of notable articles on the infringement of our neutral rights. While conceived in the very best spirit, it cannot be asserted that they had any noticeable effect.

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EMDEN

(CONCLUDED)

By LIEUTENANT HELLMUTH VON MÜCKE
Executive Officer of *Emden*

Free translation by Lieutenant J. H. KLEIN, JR., U. S. Navy

VIII. THE DISTRESS OF THE NIBELUNGS

After leaving Penang the captain decided to cruise to the southward. We imagined that all the trading ships in the Bay of Bengal would be held up in their harbors again for a considerable time. *Emden* herself had given definite notice of her presence in this region when she sank the *Zemtchug* and the *Mousquet*. Also we had to assume that the hunt for the *Emden* in the Bay of Bengal would now be more thorough than heretofore. Therefore it seemed that the Straits of Sunda gave more promise of success in capturing merchantmen. The cargo vessels coming from Australia hardly touched the waters around India; instead, when coming from the Straits of Sunda or from West Australia they proceed across the Indian Ocean straight toward Sokotra and then into the Red Sea.

The next thing was to find our collier *Buresk*. We left her outside of Penang. Due to her slow speed of barely 11 knots, she could not follow us during the engagement.

The *Buresk* was found at her previously appointed position. The news of the fight created the greatest excitement. And now, at the customary speed of 11 knots, we proceeded south. Soon we sighted the islands lying off the western coast of Sumatra. As the main ships' route lay between Sumatra and the islands, the captain decided to remain in these straits. It was not so rough behind the islands as in the open sea. We could coal more readily. Further, we had reason to believe that the first warships to search these quiet waters would be English and Japanese torpedo-boat

destroyers. It was not impossible that we might catch one or more of these.

Near the island of Sima-loer we coaled once more. The sea was so exceptionally calm that we speedily finished the job. The *Emden* was then about eight sea miles off the coast, well outside of neutral waters.

Soon a small fishing vessel, motor driven, came out from the beach and headed for us. It carried the flag of Holland at the masthead. A Dutch officer, who introduced himself as the commandant of the island, came aboard to ask if the *Emden* were not in neutral waters. In this case he requested us to go a little farther out. Whether that was the real reason for his visit, or whether he merely wanted to carry on a little conversation, I do not know. A mere estimate by eye would surely tell him that we were considerably more than three sea miles distant from the beach.

We asked him aboard. The captain also invited him to his cabin. He told us that Portugal had declared war on us. Evidently they did this for our special enjoyment. Good jokes were always welcome to us.

Unwittingly I had at first offended the commander of the island. When his boat came alongside, mistaking him for a fisherman, I asked if he had any fish for sale, which he indignantly resented. But this early misunderstanding did not mar our pleasant acquaintance. He seemed to enjoy himself in our mess room.

The *Emden* cruised about in the waters of Sunda Straits for some time. But nothing was sighted. Evidently, even in this region, all shipping had been entirely held up. Ordinarily, shipping is very active in the Sunda Straits.

For two months our ship had been cruising around among enemies. I have previously said that everybody on board was now certain that the *Emden's* operations could not continue much longer. Conditions were rapidly becoming worse. When we first entered the Bay of Bengal we knew that our enemies were not ready to thoroughly search for us and that there were few warships in the Indian Ocean. Most of their ships were after our armored cruisers in the Pacific Ocean. Soon, however, we read the reports in the newspapers and secured other information which showed us that a great number of more powerful ships were on our trail. Some of this information we received from the crews of the captured steamers.

Even the English-speaking Indians whom we captured on the steamers could speak of nothing but German defeats. Later on, however, they changed their opinions. One Indian, whom we questioned along about the end of September, said that the English newspapers contained nothing but German reverses. They also had Indian newspapers which printed articles substantially different. These papers were then suppressed by the English. But most of the Indians understood that England was not as successful as the English claimed. They were greatly pleased by this, and said: "England by-and-by finished."

Another Indian told us a characteristic story. He said that two English cruisers with two smoke-pipes and two masts always remained at Colombo. One of these was always on watch at sea, and, when relieved by the other, returned to port, etc. One day one of these cruisers returned with only one mast and one smoke-pipe, many wounded aboard, and the ship pretty well shot up. The other cruiser never returned again. Is this perhaps one of the cases where the *Emden* was destroyed?

A Chinese, coming from Hong Kong, said that one day two Japanese cruisers, severely injured by gunfire and filled up with many wounded, came into Hong Kong. *Emden* did not take part in this sea-fight, nor, as we now know, did the other ships of the German squadron.

All in all, the *Emden* was being pursued most thoroughly. The moment when her game would be played out was not far distant. The spirit of the entire ship, however, was for keeping on going. If one should come he would soon see with whom he had to reckon.

As no more ships were sighted in the Straits of Sunda, the captain decided to destroy the radio and cable station on Keeling Island. The cable connection between Australia and the home country had long since been destroyed by the other vessels of our squadron. Keeling was the last direct connection between Australia and England. Should this be destroyed, the only other connection would be via the neutral Dutch cable in the East Indies. We therefore assumed that England had made some preparation to protect their last station. It would have been an easy matter to transport several hundred men to Keeling and prevent a landing by the *Emden's* landing force. The only thing the *Emden* could do was to destroy the station with her heavy guns. But this would

not accomplish much. Especially would the cables have escaped. And as for the small apparatus needed on land, a reserve instrument could have been rigged up in a few minutes, and several hours after the destruction of the building the telegraphing could have been started up again. Also the English might have known that in case the island were attacked by the *Emden* they would not have to fear a long bombardment. The captain would have to save his ammunition for other purposes, instead of wasting it on the superficial destruction of the telegraph service.

As we had to reckon on resistance, we made all possible preparations in order that the landing force would be as powerful as we could make it. The four machine guns were taken along. A force of 50 men was equipped. In addition to the machine guns, the offensive equipment consisted of 29 rifles and 24 revolvers. It was impossible for the *Emden,* with her small complement, to land more than 50 men. We had previously, out of our own crew, manned the prizes *Pontoporros, Exford* and *Buresk,* and several men were also on the *Markomannia.*

During the night of November 8-9, 1914, the *Emden* and her tender *Buresk* were 50 sea miles west of Keeling. The collier *Exford* had been sent to another rendezvous in the ocean. It was possible that an English cruiser might be found at anchor in the harbor of Keeling. Then there was the danger of having the *Buresk* sighted and captured, while the *Emden,* returning after the completion of her task, would have to run the risk of escaping from a stronger cruiser. If she escaped she would then find her other collier at some point out of the sight of the enemy.

Buresk received orders during the night to remain 50 sea miles west of the island and not to come to Keeling unless she received orders by radio. The captain intended, in case everything went off smoothly and after the destruction of the station, to coal in Keeling Harbor.

At sunrise on the morning of November 9 the *Emden* was close to the entrance to Port Refuge, the anchorage of the island of Keeling. The difficult channel through the reefs was found. *Emden* anchored. The strong landing force embarked in the boats and started for the landing. It was 6.30 a. m. The landing was made without resistance.

After about two hours the work ashore was completed. The landing force was making ready to re-embark when the *Emden*

sent a signal by searchlight, "Expedite work!" Shortly thereafter the *Emden* blew her siren. That meant danger. The landing force saw the *Emden* quickly hoist her anchor, turn around and leave the harbor. The attempt to cut across the reefs and thereby catch up with the ship failed. Then in a few minutes *Emden* hoisted her battleflags and opened fire on an opponent that could not be seen from the boats. His presence, however, was denoted by the high splashes caused by shells striking close aboard the *Emden.*

Unable to be of the slightest assistance to their ship, the landing force was obliged to remain ashore gnashing their teeth and watching the unequal fight that was now in progress.

The *Emden's vis-a-vis* was the English-Australian cruiser *Sydney.* She being one and a half times larger, five years younger, equipped with side-armor, and carrying a battery with the same number of guns per broadside as the *Emden,* but each gun one and a half times larger, and having the superior speed, the result of this engagement was never in doubt. The inevitable and fatal hour had struck.

Soon the ships engaged in a running fight at a range of about four to five thousand meters. Broadsides of "iron-greetings" were exchanged. At first it seemed as if the enemy had suffered heavily. The *Emden's* salvos from the very beginning landed in the forward part of the enemy's ship. The gunnery of the English was not of a very superior order. Although our ship had been under fire for a considerable time, not one hit had been made on her. Then a heavy salvo landed on the *Emden's* stern. The heavy shells easily penetrated the unarmored sides of the *Emden,* causing extraordinary damage. Fire broke out under the poop. For about 15 minutes flames shot 20 to 25 meters in the air out of the after end of the ship. The gray clouds were streaked with white steam, indicating that a steam pipe on the starboard side must have been pierced. These serious injuries did not, however, prevent the *Emden* from continuing her energetic attack on the enemy. She turned with full rudder and went after him.

The stream of projectiles from her bow guns never ceased. A few minutes after the *Emden* turned toward him the enemy cruiser also turned away to starboard and drew away from our ship. As we had meanwhile noticed that he had been hit several times, we, on shore, silently hoped that he had received some fatal

injuries. Evidently this was not the case. He headed away at full speed, but shortly after he came about again. No doubt he was trying to increase the range in order to use his more powerful guns and still keep outside the effective range of the *Emden's* lighter battery.

Meanwhile the *Emden* received some more serious injuries. While turning toward the enemy, a shell knocked the forward smoke-pipe down. This huge, bulky mass lay athwart the forecastle. Almost at the same time another shell carried the foremast by the board. When I saw this I knew that at least one of my comrades lived no more—the control officer in the foretop.

The fire aboard the *Emden* continued to rage, seeming gradually to suffocate them all. Instead of flames we now saw clouds of smoke evidently caused by their attempting to put the fire out. Running along side by side, firing heavily all the time, the two engaged cruisers disappeared over the horizon.

The fight started shortly after 8.30 a. m. The *Emden's* landing force now had to prepare an old schooner lying in the harbor, *Ayesha* by name, for a trip to sea in order to be able to leave the island in case the *Emden* did not return. As the day wore on we could, on several occasions, see the *Emden* near the horizon, but not near enough to be able to make out anything. Unfortunately, we could see from time to time large, black smoke-clouds, caused by the Indian or Australian coal which the *Sydney* was using. The landing force, therefore, had to assume that the fight was still going on.

Shortly before dark that evening both vessels again approached. They still continued to fire. The last of the fight that the landing force saw was shortly before sunset. The *Emden* was then steering at slow speed to the eastward. The ship was almost entirely under the horizon. Only one smoke-pipe and the mainmast remained standing, but they gave us the indications in regard to her course and speed.

The limit of visibility, that is, the distance from Keeling to the horizon, was about eight to ten sea miles. It was, therefore, certain that shortly before sunset the *Emden* not only remained afloat, but was not more than eight to ten sea miles distant from South Keeling. The *Sydney* was nearer the island. We could see her masts, smoke-pipes, superstructure and upper deck. Both vessels still fired, but the *Emden's* fire was intermittent and not very heavy.

Either her ammunition was exhausted, for she had expended a considerable amount during the Madras bombardment and the Penang battle, or a majority of her guns were put out of action.

At sunset the *Sydney* broke off the engagement and steered in a northwesterly direction. *Emden* was heading easterly.

Gradually the ships drew outside of the range of their guns. The firing ceased.

The sun sets. It is getting dark. Like a shroud, night draws over both ships.

The landing force leaves Keeling on the *Ayesha* in order to hunt the *Emden*.

And so it happened that a ship, completely overpowered by the enemy, managed to continue the fighting for about ten hours. The combined advantages of armor, speed and armament need not be explained to those who are acquainted with naval affairs. On land, a small detachment, properly equipped, can utilize the natural surroundings to lie under cover behind wire defences with decked-over field-pieces and machine guns, and withstand a decidedly more powerful attacking foe for long periods, and even prevent his attaining his goal, as, for instance, an attempt to break through his line. The attacker cannot gain any decided advantage because of his superior numbers. His superiority is offset by the uses to which nature is put by the weaker defending force.

But at sea it is very different. There is no protection. The result is invariably decided in favor of the personnel enjoying the superiority of gunfire, the greater thickness of armor, and the superior speed.

Considering these factors, it becomes very evident that the *Emden* fought against heavy odds. Unarmored, decidedly smaller, handicapped by an inferior battery and slower speed than her armored opponent, she still managed to battle for half a day until darkness put an end to the engagement.*

During the night the landing-force failed to pick up the *Emden*. Not until three weeks later, on their arrival at Penang, did they learn of the fate of their ship.

The song is ended. *Emden* is no more. The rocky reefs of North Keeling became her grave.

But just as long as the monsoons whisper through the high-crowned palms of this now world-famous island, joining the white,

* The report of Captain Mueller of the *Emden* appeared in No. 155, p. 262-267.

foaming surf of the Indian Ocean in singing the death song of the *Emden,* that long will people speak and sing of "The Flying Dutchman," the little German ship that, in the great World's War of 1914, cruised in great circles around in the open ocean, and, for months at a time, put the fear of God into the enemy.

Schiff ohne Hafen, Schiff ohne Ruh,
Fliegende, fliegende Emden Du.
Deutscher Lorbeer um Mast und Bug,
Hinter Dir her der englische Fluch.
Schiff um Schiff in den Grund hinein
Und das Meer, und das Meer, und das Meer war Dein.

Schiff ohne Hafen, Schiff ohne Ruh,
Herrliche, herrliche Emden Du.
Wärst nun getroffen von feindlicher Hand?
Wärst nun vergangen in lodernen Brand?
Wärst nun versunken im weiten Meer?
Wärst nun gestorben? Nein, nimmermehr, nimmermehr.

Schiff ohne Hafen, Schiff ohne Ruh,
Unvergessliche Emden Du.
Kannst ja nicht sterben, es jagt daher
Ewig Dein Schatten über das Meer.
Ewig dem Feinde zu Fluch und Leid.
Ewig in deutscher Unsterblichkeit.

TRANSLATOR'S NOTE.—The foregoing is quoted verbatim in German so that the German reader may not lose the sentiment in these verses. The following translation is submitted with many apologies, etc., to the author.

Ship without harbor, ship without rest,
Our fleeing *Emden,* we love thee best.
Singing thy deeds in German verse,
Ever behind thee the English curse.
Ship after ship sent down to the deep,
But the sea, the broad sea, was thine to keep.

Ship without harbor, ship without rest,
Wonderful *Emden,* we love thee best.
Even though struck by the enemy shell,
Even though burned by a raging hell,
Even though sunk on a far away shore,
Hast been forgotten? No, nevermore.

Ship without harbor, ship without rest,
Memorable *Emden,* we love thee best.
Thou hast not died, ever we see
Thy flying shadow racing the sea.
Always the curse of the foe to be
Ever thy deeds in our memory.

PRESS CLIPPINGS

[*Norddeutsche Allgemeine Zeitung*, November 12, 1914]

THE "EMDEN" AND HER COMPULSORY GUESTS

The adventures of four English captains whose vessels were sunk by the *Emden* in the Indian Ocean are reported in the *Ceylon Times* of September 29, 1914, as follows:

Captain J. J. Tullock of the *Tymerie* relates: "We left Colombo on Friday (Sept. 25) and sailed along until at 11.25 p. m. we ran across a man-of-war without lights. The warship, which, as we later discovered, was the *Emden*, sent us a signal by lantern to stop. A boat, commanded by a lieutenant, was lowered and approached us. The officer said to me: "We are a German man-of-war and I want to see your ship's papers." Then they gave us 10 minutes to leave the ship and informed us that we were prisoners. After the Germans had searched the ship for provisions and the last boat had left our ship, we heard a muffled explosion. They had blown up the ship and she sank in the ocean. The chief engineer and I were taken aboard the *Emden* and treated very decently. They would not provide us with lights at night. But the officers gave us cards so that we could play during the day. The ship was full of living things, and even though they had many provisions which they took from captured ships, they seemed to be using them very sparingly."

Captain J. Isdale of the *Ribera* (sunk 300 miles west of Colombo) said: "My mate saw him first. 'Cruiser in sight, captain,' he called to me. Then the cruiser made the signal 'Stop immediately!' I said to the mate, 'Tell him, he has no right to stop us before he shows his flag.' The next instant the flag was hoisted. 'Damn we are finished!' Then an officer boarded us and said, 'Gather up as much clothes as possible and be quick about it, your ship is about to sink.' Then he asked about provisions and took everything along with him because, he said, they had to have them to live on. Otherwise he was very friendly. 'What would you, captain, 'tis the luck of war.' He gave me a half hour to take everything we wanted to the *Grypevale*, a captured ship, that was to take the prisoners to Colombo, the nearest English port."

Captain W. H. Gibson of the *Foyle* (sunk 315 miles off Colombo): "The German officers were very polite. I may say extraordinarily polite. Before we left in the *Grypevale* for Colombo, they all wished us a pleasant journey."

Captain D. Harris of the *King Lud*: "'Unfortunately we have no harbor to which to send you; as you all did to our ships,' said the officer who came on board my ship. 'Get ready to leave your ship. She must be sunk within one hour.'"

[*Norddeutsche Allgemeine Zeitung*, November 8, 1914]

HOW THE "EMDEN" SHOT UP MADRAS

Brief news reports are now drifting in regarding the bold deed of our *Emden*, who, when she bombarded Madras, gave the Englishmen a wholesome scare.

"The night of September 22d was quiet and peaceful," says a reporter from Madras in describing the event. "The moon was not shining, and thick clouds hid the skies, when suddenly, about four kilometers outside of the harbor, there appeared an unusual light. A series of dotonations followed, suggesting heavy explosions. Several seconds later the grayish, white light was replaced by high red flames that illuminated the whole sky, accompanied by powerful crashes and booming, and then all was still. I ran from my veranda to the roof of my house where the rolling flames could be seen much more easily and where I could hear many other noises such as the rattling of autos, tooting of trumpets, and the ringing of bells in the new court house. What had happened? We had known for several days that the German cruiser *Emden* was in the Bay of Bengal. She had captured and sunk several ships in the northern part of the bay and it was rumored that she would probably eventually visit Madras. Evidently that is what had happened. The cruiser had quietly approached until she was a short distance from the harbor and, from there, she sent her messengers of destruction into the city. One projectile fell in the bed room of the director of the Burmah Oil Company. He ran down stairs in order to get his wife and family to safety, when he saw a shell hit on the petroleum tanks; a few minutes later a shell set fire to one of the other tanks. Giant flames burst forth. One of the men on night watch was killed, another wounded. Also an Indian policeman was killed down in the harbor; his body was found later on in the water. One shell fell on a ship in the harbor, killing and wounding several people. As soon as the oil tanks caught fire, the *Emden* fired a few more shots into the town that fell in various different localities. The defences of Madras are not very strong, but there are several guns here that now came into action. After the third shot from these guns, *Emden* put out her searchlights, which were in use during the bombardment, and disappeared into the darkness. Unfortunately, Madras has no searchlights with which she might have been picked up."

In another letter concerning the bombardment, an officer from Madras writes: "The captain of the *Emden* is a Sahib (gentleman). He wanted to do some damage to the town, but to spare as many lives as possible. He had officers and men aboard who knew Madras perfectly. The ships in the harbor were easier prey than the petroleum tanks. Why did he not shoot at the ships? He knew that if he managed to set fire to the oil tanks the burning oil would flow into the harbor and set fire to the ships. For this reason I say that the *Emden's* captain is a Sahib. But his shells struck empty tanks and those that contained refined illuminating oil. So he did not quite succeed in his task."

BRIEF DESCRIPTIONS OF *EMDEN* AND *SYDNEY*

"EMDEN"

Built at Danzig. Commissioned, Fall of 1908.

Authorized, 1906. Laid down, June, 1906. Launched, May 26, 1908.

Length, 386.6 feet. Beam, 44.3 feet. Draught (mean), 15.8 feet.

Displacement, 3592 tons.

I. H. P., 16,168, equals 24.1 knots.

Coal capacity, 393 to 836 tons.
Engines, two sets triple expansion reciprocating.
Boilers, 12 Schultz.
Armor, deck, 2 inches to .8 inch. Conning tower, 3.9 inches.
Armament, 10 4.1-inch (40 caliber); 2 machine guns. Torpedo tubes, 2 18-inch submerged on broadside.
Complement, 361.

"SYDNEY"

Built at Govan.
Laid down, April 14, 1911. Launched, May 30, 1912.
Length, 456.5 feet. Beam, 49.8 feet. Draught (mean), 15.7 feet.
Displacement, 5400 tons.
I. H. P., 22,000, equals 24.7 knots.
Fuel capacity, coal, 650 to 1000 tons; fuel oil, 250 tons.
Engines, 4 shafts, Parsons turbines. Boilers, Yarrow.
Armor, belt, 3 inches; deck, 1 inch.
Armament, 8 6-inch (50 caliber); 4 3-pdr.; 4 machine guns. Torpedo tubes, 2 21-inch submerged on broadside.
Complement, 376.

THE *EMDEN-SYDNEY* ENGAGEMENT

Extracts from a letter written by an English naval officer aboard H. M. S. *Sydney*, describing this engagement, taken from the *London Times* of December 15, 1914.

"On November 9 we were steaming about 50 miles to the eastward of the Cocos Islands (southwest of Java), heading for Colombo, when at 7 a. m. we took in a very interrupted wireless message from the Cocos wireless station: 'Strange warship . . . . off entrance.' The *Melbourne*, as senior officer, ordered us to raise steam for full speed and go and investigate.

"At 9.15 a. m. the tops of the cocoanut trees of Keeling Islands were sighted. At 9.20 we sighted the *Emden*, or rather the tops of her funnels, 12 or 15 miles away. At 9.40 a. m. she opened fire at a very big range, and shortly after that we started in on her.

"Throughout the action I was almost constantly engaged running backwards and forwards between the ammunition hoist and the forecastle gun or between the hoist and No. 1 starboard or No. 1 port.

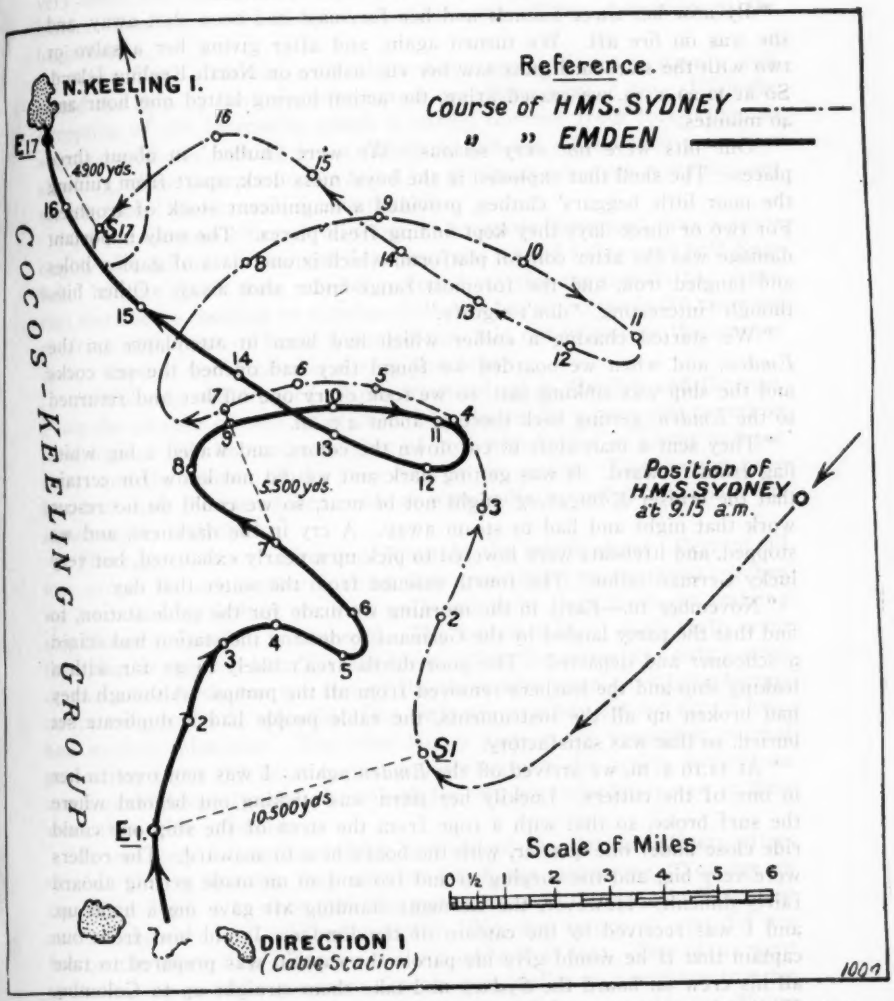
"The hottest part of the action for us was the first half-hour. We opened fire from our port guns to begin with. I was standing just behind No. 1 port, and the gunlayer (Atkins, 1st class petty officer) said, 'Shall I load, Sir?' I was surprised, but deadly keen there should be no 'flap,' so said, 'No, don't load till you get the order.' Next he said, '*Emden's* fired, Sir.' So I said, 'All right, load, but don't bring the gun to the ready.' I found out afterwards that the order to load had been received by the other guns 10 minutes, and my anti-'flap' precautions, though they did not the slightest harm, were thrown away on Atkins, who was as cool as a cucumber throughout the action.

"Later I heard a crash and looking aft saw that a shell had hit near Gun No. 2 starboard. But owing to the screen being in the way, I did not know it had knocked out practically the whole of that gun's crew. Not seeing any flame or smoke rising (we cope with the smallest fire immediately) I went on with my job. This required continual attention. The men are splendid at loading drill, but to practise supply of ammunition is almost impossible in peace time. To have a big supply stacked on the upper deck is far too dangerous a proceeding in action, and what with getting an even distribution of projectiles and cartridges between the two guns, getting the safety caps off, with fiddly pins and things to take out, attending to misfires, cheering up the one or two who seemed to be 'pulling dry,' you can imagine I had little time to be thinking much about the *Emden*. I noticed once or twice when going forward the starboard side to the forecastle gun that we seemed to be in the thick of it. There was a lot of 'Wheee-oo, Wheee-oo, Wheee-oo,' and the 'But-but-but' of the shell striking the water beyond, and as the range was pretty big, this is quite possible, since the angle of descent would be pretty steep.

"Coming aft, I heard a shot graze the top of the shield of No. 1 starboard. A petty officer now came up limping from aft, and said that he had just carried an officer below (he was not dangerously hit), and that the after control position had been knocked right out and every one wounded (they were marvelously lucky). I told him if he was really able to carry on to go aft to No. 2 starboard and see there was no fire, and if there was that any charges about were to be thrown overboard at once. He was very game and limped away aft. He got aft to find a very bad cordite fire just starting. He with others got this put out. I later noticed some smoke rising aft, and ran aft to find that it was just the remains of what they had put out, but found two men, one with a badly wounded foot, sitting on the gun platform, and a petty officer lying on the deck a little further aft, with a nasty wound in his back. I found one of the men was unwounded, but badly shaken. However, he pulled himself together when I spoke to him, and told him I wanted him to do what he could for the wounded. I then ran back to my group.

"All the time we were going 25 and sometimes as much as 26 knots. We had the speed on the *Emden* and fought as suited ourselves. We next changed round to starboard guns and I then found the gunlayer of No. 1 starboard had been knocked out close to the conning tower, so I brought Atkins over to fire No. 1 starboard. I was quite deaf by now, as in the hurry there had been no thought of getting cotton wool. This is a point I won't overlook next time.

"Coming aft the port side from the forecastle gun I was met by a lot of men cheering and waving their caps. I said, 'What's happened?' 'She's gone, Sir, she's gone.' I ran to the ship's side, and no sign of a ship could I see. If one could have seen a dark cloud of smoke, it would have been different. But I could see no sign of anything. So called out, "All hands turn out the lifeboats, there will be men in the water.' They were just starting to do this when someone called out, 'She's still firing, Sir,' and every one ran back to the guns. What had happened was a cloud of yellow or very light colored smoke had obscured her from view, so that looking in



The numbers in the above diagram indicate the respective positions of H. M. S. *Sydney* and of the *Emden* at various stages of the decisive action on November 9.

Key:—H. M. S. *Sydney*
- 1— 7 Port Battery.
- 8—11 Starboard Battery.
- 12—16 Port Battery.
- 17 Starboard Battery.

Thereupon "Ceased Fire," and steered N. in pursuit of the *Emden's* collier.

her direction one's impression was that she had totally disappeared. Later we turned again and engaged her on the other broadside.

"By now her three funnels and her foremast had been shot away, and she was on fire aft. We turned again, and after giving her a salvo or two with the starboard guns saw her run ashore on North Keeling Island. So at 11.20 a. m. we ceased firing, the action having lasted one hour and 40 minutes.

"Our hits were not very serious. We were 'hulled' in about three places. The shell that exploded in the boys' mess deck, apart from ruining the poor little beggars' clothes, provided a magnificent stock of trophies. For two or three days they kept finding fresh pieces. The only important damage was the after control platform, which is one mass of gaping holes and tangled iron, and the foremost range-finder shot away. Other hits, though 'interesting,' 'don't signify.'

"We started chasing a collier which had been in attendance on the *Emden*, and when we boarded we found they had opened the sea cocks and the ship was sinking fast, so we took every one off her and returned to the *Emden*, getting back there at about 4 p. m.

"They sent a man aloft to cut down the colors, and waved a big white flag from forward. It was getting dark and we did not know for certain that the cruiser *Königsberg* might not be near, so we could do no rescue work that night and had to steam away. A cry in the darkness, and we stopped, and lifeboats were lowered to pick up a nearly exhausted, but very lucky German sailor. The fourth rescued from the water that day.

"November 10.—Early in the morning we made for the cable station, to find that the party landed by the Germans to destroy the station had seized a schooner and departed. The poor devils aren't likely to go far with a leaking ship and the leathers removed from all the pumps. Although they had broken up all the instruments, the cable people had a duplicate set buried, so that was satisfactory.

"At 11.10 a. m. we arrived off the *Emden* again. I was sent over to her in one of the cutters. Luckily her stern was sticking out beyond where the surf broke, so that with a rope from the stern of the ship one could ride close under one quarter, with the boat's bow to seaward. The rollers were very big, and the surging to and fro and so on made getting aboard fairly difficult. However, the Germans standing aft gave me a hand up, and I was received by the captain of the *Emden*. I told him from our captain that if he would give his parole the captain was prepared to take all his crew on board the *Sydney* and take them straight up to Colombo. He stuck a little over the word 'parole,' but readily agreed when I explained the exact scope of it. And now came the dreadful job of getting the badly wounded into the boats. There were 15 of these. Luckily we have a very good pattern of light stretcher into which men can be strapped. We got three badly wounded in each boat. The Germans were all suffering badly from thirst, so we hauled the boats' water casks up on deck, and they eagerly broached them, giving the wounded some first.

"I took an early opportunity of saluting the captain of the *Emden* and saying, 'You fought very well, sir.' He seemed taken aback, and said 'No.' I went away, but presently he came up to me and said, 'Thank you

very much for saying that, but I was not satisfied. We should have done better. You were very lucky in shooting away all my voice-pipes at the beginning.'

"When I got a chance, with all the boats away, I went to have a look round the ship. I have no intention of describing what I saw. With the exception of the forecastle, which is hardly touched from fore-bridge to stern post. she is nothing but a shambles, and the whole thing was most shocking. The German doctor asked me to signal for some morphia, sent me aft, and I never came forward again.

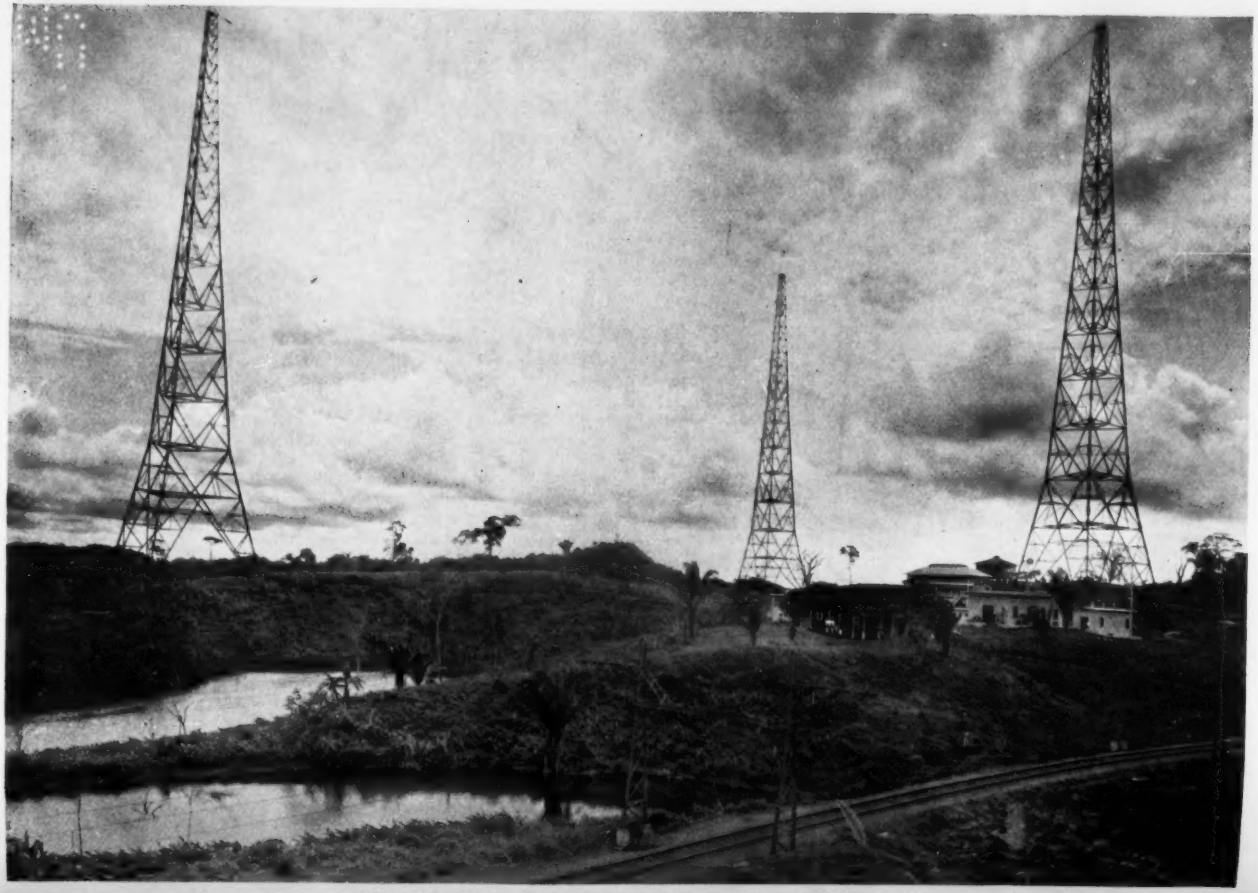
"Of the German officers, Witthoef, the torpedo lieutenant, was a thoroughly nice fellow. Lieutenant Schal was also a good fellow, and half English. It quite shook them when they found out that the captain had asked that there be no cheering on entering Colombo, but we certainly did not want cheering with rows of badly wounded men laid out in cots on the quarter deck. Captain von Muller is a very fine fellow.

"At Colombo we dropped all our wounded cargo, English and German. From the number of men we rescued, *i. e.*, 150, we have been able to reckon their losses. We know the number of men who landed at Cocos and got away, and the number of the prize crew in the collier. They cannot have lost less than 180 men killed, with 20 men badly wounded and about the same number slightly.

"There are lots of redeeming points in the whole show. Best of all was to see the gun's crew fighting their guns quite unconcerned. When we were last in Sydney we took on board three boys from the training ship *Tingira,* who had volunteered. The captain said, 'I don't really want them, but as they are keen I'll take them.' Now the action was only a week or two afterwards, but the two of the three who were directly under my notice were perfectly splendid. One little slip of a boy did not turn a hair, and worked splendidly. The other boy, a very sturdy youngster, carried projectiles from the hoist to his gun throughout the action without so much as thinking of cover. I do think for two boys absolutely new to their work they were splendid.

"It was very interesting talking to some of the German officers afterwards. On the first day they were on board one said to me, 'You fire on the white flag.' I at once took the matter up, and the torpedo lieutenant and an engineer both said emphatically, 'No, that is not so, you did not fire on the white flag.' But we did not leave it at that. One of us went to the captain, and he got from Captain von Muller an assurance that we had done nothing of the kind, and that he intended to assemble his officers and tell them so.

"The day Captain von Muller was leaving the ship at Colombo, he came up to me on the quarter deck wounded, shook hands and saluted, which was very nice and polite of him. I think, acting under their rules, he and his crew refused to give parole after their arrival at Colombo, but he conscientiously observed it while in the *Sydney,* which was more like a hospital ship than a man-of-war, while running to Colombo. Prince Hohenzollern was a decent enough fellow. In fact, we seemed to agree that it was our job to knock one another out, but there was no malice in it."



DARIEN RADIO STATION, OPENED JUNE 1, 1915

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVAL RADIO STATIONS OF THE PANAMA CANAL ZONE

By LIEUTENANT R. S. CRENSHAW, U. S. Navy

DARIEN RADIO STATION, OPENED JUNE 1, 1915

In its system of radio communication for the Canal Zone, the navy has kept up to the high standard set by the Canal in general in having thoroughly modern equipment. The layout comprises one coastal station at each end of the Canal for ship to shore work, and one high-power station for long distance work.

In 1911, after several unsuccessful attempts by the representatives of the army and the naval interests to agree upon plans for the high-power radio station here, which was so important to the navy for its fleet communication, the matter was submitted to the joint Army and Navy Board. This board, whose report was approved by the President, recommended, among other things, that no private or commercial wireless installations be permitted in the Canal Zone; that the Navy Department have authority to install, maintain and operate under its jurisdiction a high-power wireless station in the Canal Zone, to be used in connection with its other stations in the Atlantic and Pacific, and for controlling the movements of its fleets in waters adjacent to the Panama Canal; and finally, that the wireless stations under the jurisdiction of the Navy Department shall be opened to the public service and shall transmit commercial business.

Darien Radio Station then was built as soon as the department had worked out the engineering features. The Colon station had been built by the Navy Department in 1904. The department then built the Balboa station in 1913 to handle ship to shore work for the Pacific side. These three stations are thus links in the department's comprehensive plan for radio communication with the fleet for purposes of national defence. As all other links of this chain are under naval administration it is necessary that these be likewise under that department.

The department has adopted the policy of making them indispensable to the Canal government both in its operating and military features, with the end in view that it may not be necessary to duplicate the stations with either government or commercial stations. In this way, besides automatically having control of radio already in the hands of the national defence on the opening of hostilities, there is always the least amount of interference possible, time is not wasted by dividing the hours with commercial neighboring stations, and important messages may be given right of way. The stations further will be manned at the opening of hostilities with the personnel familiar with the local conditions. The usual peace time means of communication being through these stations, the naval ships, transports or merchant auxiliary, at this time, will be thoroughly familiar with the stations as to wave lengths, radius of communication and land line connections. Further, all radio traffic connected with the operation of the Canal is handled in accordance with the governor's regulations and the facilities of the station have been offered to the governor, or his representatives, for Panama Canal or other official radio work.

Both Colon and Balboa stations handle commerical messages with ships and Colon handles messages with neighboring shore stations to which the cable service is unreliable. The low naval rate of six cents a word is charged here. Thus the necessity for commercial stations is obviated.

As is done at all naval radio stations, official messages for any departments of the government are handled free of station charge.

The Canal, as every one knows, is here to handle shipping and to do it in the most expeditious way. Hence Article 40 of Executive Order giving the regulations for the operation of the Canal states that "as soon as radio communication can be established with the Canal, vessels should report their names, nationality, length, draft, tonnage, whether or not they desire to pass through the Canal, require coal, provisions, supplies, repairs, to go alongside of a wharf, the use of tugs, probable time of arrival, length of stay in port, or any other matters of importance or interest. If this information has been previously communicated, through agents or otherwise, to the captain of the port, it will not be necessary to report by radio, but the probable time of arrival should always be sent." Any radio messages relating to any of these subjects are regarded as Canal business and are handled

without station charge, whether from the master of a ship or from the Canal authorities. Also all ships are required to keep an operator on watch while making the passage of the Canal. This provision is to allow for transmitting rush orders relating to dispatching the ship through. There are now numerous visual signal stations along the route handled by telephone from the Marine Department, so that radio dispatching is only an emergency measure now. Before the visual signal stations were complete, however, four to six reports were received from each ship making the passage.

As a convenience to responsible steamship companies a monthly account is allowed for charges due on messages sent to their ships. Arrangements have been made with the Panama Canal whereby the bills for these messages may be paid by the Panama Canal from the company's deposit which has been put in the hands of the collector of the Canal, in advance, to cover all charges incurred in the passage of each ship.

During the construction days of the Canal the commission operated a quarry at Porto Bello, just 18 miles north of Colon on the coast. From here was obtained the rock for the building of the Gatun spillway and locks and for the breakwater in Colon harbor. To avoid the expense of installing and maintaining a telephone service there the Navy Department installed and operated a small radio outfit in a building owned by the Canal. Working with Colon this was used instead of telephonic communication for the commission's work.

The radio time service has been found to be of use here. The time signal now received on the Isthmus comes by the Central and South American cable over their line down the west coast. This signal is transferred to the cable from the land line at Galveston and passes through four cable relays before reaching Colon, where it is put on the Panama Railroad telegraph system through another relay. These relays are all automatic except the one at Panama, when the signal is forwarded by hand as the operator watches the syphon beat. In checking this time signal against that received by radio from Key West, the writer has observed varying errors of from one to three seconds lag even over that from Key West, which itself has the lag due to the land line relays from Washington. The port captain at each terminal port has a chronometer for use of merchant skippers in comparing their

chronometers. In his office is also brought an instrument from the Panama Railroad telegraph line over which the time signal is sent from Darien daily by hand as the operator hears the signal in his radio receiver. This crude method has proved to give better results than attempting to rate the chronometer by cable signal.

This system will be much improved upon the arrival of the up-to-date time transmitting installation which has been ordered for Darien radio station. It will consist of a transmitting clock, one of the same kind ordered for the Naval Observatory at Washington. This clock will be set by electrically accelerating or retarding the period of the pendulum until the error is corrected. To set the clock, a local signal will be taken from the break of the main sending key of the radio transmitting set and brought into step with the time signal as being received by radio from Arlington. Darien will then transmit shortly after, before the clock has attained an error due to the rate it may have. A well rated break circuit chronometer will carry us over those schedules on which it may be impossible to set the clock by direct comparison. This time signal will probably be transmitted over the land wire for the railroad and made to operate a time ball at the terminal ports. With a bulletin giving the error each day, the installation is expected to be capable of giving a signal in Central and South America within the limits of accuracy suitable for astronomical work.

THE DARIEN RADIO STATION

The Darien Radio Station is located just 25 miles south of Colon on the Panama Railroad. The railroad forms the east boundary of the reservation which contains 87½ acres. The southwest boundary is the Canal itself from which is a channel 20 feet deep and 75 feet wide into the center of the station plot. Those who may have visited the Canal before the water was allowed to rise may remember this site as being adjacent (to the southeastward) to the old town of San Pablo. On the "relocation" the nearest stop was Caimito Cabin at the north end of dumps. Thus the site was known variously as the San Pablo or Caimito Radio, or simply as Radio in the early stages, until the department assigned the name Darien, when, by request, the governor named the railroad stop here Darien. Until the name was well known, our mail frequently went astray to the southern-

most province of the Panama Republic which is known as the Darien section.

This plot was decided upon with the following advantages in view. It was well out of gun range from either end, it was accessible to the railroad and Canal both, it was very close to the source of power (the trans-isthmian high tension line along the railroad), receiving tests showed the ground conditions to be good, and, finally, with the idea in mind of locating the towers on the hilltops and having an arm of the Gatun lake come in under the antenna between the towers, a good effective height could be obtained with moderately high towers.

COLON RADIO STATION, REMODELLED 1915

Work started on construction in December, 1913, by the Quartermaster Department of the Panama Canal. The site was far removed from any of the Canal Zone towns and was mostly jungle when the work started. A spur from the railroad was put in, laborers' barracks built and, as it is unsafe to unload cement in the open due to the sudden rains, a cement shed was erected close to the spur. With a hoisting engine on the hill all material was hauled up a narrow-gauge road in De Cauville dump cars. This narrow gauge road continued around the station site for the delivery of material to the buildings and towers. The small locomotives, cars and tracks were relics of the French construction days. Water for the station was pumped to a tank on a hill by a Worthington pump which obtained its steam from the boiler of

an old Belgian locomotive side-tracked for that purpose. Drinking water was distilled at this pump station. This equipment supplied the station until the arrival of the electric turbine pump. The Gatun lake water is now used and merely boiled for drinking and cooking purposes.

The dwellings on the site are the house of the radio officer, cottage for the chief electrician in charge and barracks for the operators equipped to house 17 men. Servants' quarters are also provided in the barracks building. Rations are commuted at a dollar a day per man and a mess is run by the operators.

All the buildings are screened, including the porches. There is such a large breeding area for mosquitoes about the site that the cost would prohibit sufficient sanitation work to keep the mosquitoes down entirely. The means we have adopted are (1) keep the screening as tight as possible; (2) every morning a sanitary inspector makes the rounds catching the mosquitoes inside the living quarters and office; (3) no containers are allowed to collect water, in which they may be breeding, on the station site; (4) all drains are kept clear so no water stands in puddles; (5) around the edges of the water the bank is kept skinned to allow the small fish to eat the mosquito larvæ (this means is remarkably effective); (6) the force of five laborers allowed the station is kept at work on the grounds keeping the jungle growth cut down as well as possible. Then when one case of malaria did appear, in order to prevent an epidemic, the whole station crew was put on a quinine diet for 10 days.

The other buildings of the station are of concrete except the boat-house. This was built of old form lumber left over from the concrete work, and corrugated iron roofing robbed from old abandoned shacks on the site, one of which was an old distillery. The transformer house contains only the main transformers (with oil switches and lightning arresters) where the 44,000 volts from the transmission line is stepped down to 440 volts.

The power house is 60 feet by 30 feet and contains the motor generators for the main transmitting set, which uses 500 to 1200 volts direct current, and that for the auxiliaries using 110 volts direct current. The main distributing and controlling switchboards are here, with the auxiliary transformers. Also this building houses the machine tools, a small lathe, drill press, milling machine and emery grinder and is fitted with a five ton overhead traveling crane.

The operating building contains the arc room (where is located the main transmitting set with its auxiliary electric controlling devices), the receiving room and the office, beside a spare room for an auxiliary sending set if needed later. The arc room and the receiving room both have wire mesh imbedded in their walls, floor and ceiling in order to prevent the induction from the transmitting set injuring the receivers. The building is fire-proof, necessary on account of the action of the continuous oscillations used at such high voltage. The charging current into iron in the vicinity of any live lead heats the iron quickly. Some of the reinforcing had to be taken out of one concrete base because the current jumped to it, and one wall 19 inches away from the end of the helix heats so that the hand cannot be borne on it after a 20 minute run. The reinforcement in this wall is merely metal lathing but is directly in the field of the main helix.

The towers for this station are of structural steel, triangular sections, self supported. There are three 600 feet high each. As mentioned earlier in this article, it was the first intention to locate them on the tops of the hills, but on making the actual location it was found that the thrusts (which come on to the footings at the angle of slightly over 16 degrees from the vertical) would be too nearly parallel to the face of the hills to give solid backing for the footings. They were finally located so that all footings but one butt into the hills. In order to do this, however, the footings were put on about the 120-foot level instead of the 170-foot (the surface of Gatun lake being normally at the 85-foot level).

For each tower the feet form an equilateral triangle 150 feet on the side and taper upward to a triangle ten feet on a side at the top. When first erected there was considerable swaying in the bottom long diagonals, but these and others above were stiffened up by cross bracing so that now they are perfectly rigid. When the antenna was hoisted and adjusted to the sag which would give a pull of about 13,000 pounds, the top of each tower was pulled over only four inches during hoisting and settled back to two inches when hoisting stopped. All the bend was in the upper 200 feet.

The block for each footing is 16 feet deep and 20 feet square, heavily reinforced with old railroad rails. Each block filled entirely the hole excavated for it without back filling in order to have it bearing in solid earth. Each tower leg is insulated from the

ground with heavy porcelain insulators. However it has been found that greater radiation is obtained and the arc "pulls" better with the towers grounded, so they are left grounded through a long knife switch. The distance between towers is: one and two, 897 feet; two and three, 751 feet; one and three, 969 feet, the antenna covering about six acres. The capacity, however, of this antenna is just the same as that of Arlington (.01 M. F.), though much larger in every way. Darien's capacity is evidently between the antenna and the ground, while Arlington's is between the antenna and the towers. The antenna was made at the New York Navy Yard and shipped to Darien, each wire on a separate reel and tagged to mark the points where any other wire crossed. The cables are all phosphor-bronze, the outside ones being ¾-inch diameter, the four strain cables through the mat ⅜-inch diameter, and the 66 radiating wires of regular antenna wire. The first 150 feet of the down lead of 26 wires is a fan and then is grouped by spacing hoops to form the rattail. Each corner is insulated with the Arlington type of Locke insulators with, however, two strings in parallel, as the strain was too near the mechanical breaking limit of the insulators. Lightning has already struck the antenna twice without damage, due to the safety gap feature of these insulators and the towers being grounded. An electric winch on each tower furnishes the power needed for handling the antenna.

The Bureau of Steam Engineering generously provided the excellent machine tools mentioned above, and with the help of those and a chief machinist mate in the complement the station is practically self-sustaining, as it has to be, without the usual navy yard facilities.

The variety of up-to-date equipment at this station furnishes a striking example of the wide field in general electricity which the radio service opens to its electricians. The operators of Colon and Balboa stations are given tours of duty here to familiarize them with the special features.

Power for the station is taken from the Panama Canal transmission line. The current is 25 cycle A. C., three phase, supplied at 44,000 volts and stepped down in the substation through transformers to 440 volts. The transmission line is in duplicate and is fed from either the hydro-electric station at Gatun Spillway or from the Miraflores steam power plant. This duplication of lines

and power plants both, has given so reliable a service that no gas or oil engine has been put in as a stand-by source of power.

The high tension A. C. equipment is up-to-date, the two lines being controlled by interlocked oil switches. In the system are also aluminum plate electrolytic lightning arresters to which the heavy switching or lightning surges jump through horn gaps on the roof of the substation. All of the motors in the power house are 440 volt, but on account of the trouble with insulation in the very damp climate, those for use outside are of 220-volt type To give the 220 volt current there are three single phase 440-220 volt transformers. Further, in order that supplies may be drawn from those standard in the Canal storehouses, all lighting was made 110 volts. This is obtained by stepping down a tap from one phase of the 440 volt current.

The motor generator sets for the main transmitter are in duplicate. To provide for emergency drive a pulley has been provided which fits in the place of either motor. In this event, arrangements have been made to use a steam engine from some retired Panama Canal equipment, furnishing it with steam from a locomotive to be side-tracked here.

The main set was furnished by the Federal Telegraph Company, and the arc generator is their type of the Poulsen arc. From 600 to 1000 volts are used across the arc. The set gives Arlington a signal easily readable except during the very worst static periods.

The arc can be controlled entirely from the operator's seat, the main generator voltage controlled there, circuit breakers closed or tripped, the arc struck and starting resistances short-circuited. While running, the arc is regulated to take up the wear of the carbon by foot pedals, so that the operator may not have to interrupt his sending.

The regular receiving cabinets with tikkers, as used by the Federal Telegraph Company, were provided with the outfit, but Dr. Austin's circuits with the oscillating audion are now used exclusively for long waves. For short wave work an oscillating audion detector is used on one of the Federal Company's cabinets.

While these are primarily military stations and are located to best suit the military needs, their peace time activities are what we have to use for shaking them down. This is particularly true in the region of the Canal Zone, where the navy is so far away and

the stations do not get into the maneuvers. The traffic handled during the month of July (1915) was: Colon, 2299 messages; Balboa, 396; and Darien, 348. Colon handled over 800 commercial messages—over half with ships, the remainder with the United Fruit Company stations at Port Limon (Costa Rica), Bocas del Toro (Rep. de Panama) and Santa Marta (Colombia). Most of the United Fruit Company messages are in ten letter code words. This, with the messages in Spanish handled for the Panama Government, gives the operators at that station the best of practice. This is particularly true in that the bad static holds for eight or nine months of the year, and it is a fight for each letter when receiving through it. In justice to Darien it may be said that most of its messages are long, and if reckoned by the number of words would make a much better showing. The traffic of this station is rapidly increasing, as the various departments of the government accept the offered services of the naval radio.

The Colon and Balboa stations use as their main sending set a five K. W. Lowenstein spark set. Each station also has a two K. W. auxiliary, and the Colon station has retained its big set for use with Key West in case of an interruption of the Darien-Arlington communication. Both Colon and Balboa stations have been rebuilt in the past 12 months. These stations are equipped with concrete power houses and operating buildings and the navy standard 300-foot steel towers. This, with the comfortable living quarters for the crew and the up-to-date radio equipment, places these stations among the best the navy has.

All three of the radio stations are connected to the Panama Railroad telephone system through the local exchanges, Darien being on Colon and Balboa exchanges both. All government messages from Darien, or from the coastal stations which are in code, are delivered by telegraph, three lines of which come into each station. Commercial messages for other towns than the local town are forwarded by wire. This wire work requires the operators to become proficient in American Morse.

Now that the Canal is open, it is hoped that the fleet may visit this vicinity more, in order that the operators here may do more navy work. They have daily excellent drilling in all features of radio, except the actual maneuvers with the fleet.

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVAL ACADEMY FROM THE VIEW-POINT OF A FRENCH OFFICER

Translated from the French *Le Journal d'un Aspirant*

By LIEUT. COMMANDER O. W. FOWLER, U. S. Navy

I was dining recently at a club in France much frequented by the officers of the army and navy. At my table were seated six officers of the French Navy, all of the rank of commander or above. With the exception of my host, none of the officers knew that I had ever been in the United States Navy, so that when the subject of the recent notes between our country and Germany in reference to the sinking of our ships and the drowning of our citizens, was being discussed, they spoke very freely about the condition of our navy. One commander was especially critical of our service and of the method of training midshipmen at the Naval Academy. Some of his statements were so much in error and so ridiculous to one having even a slight knowledge of the course pursued at Annapolis, that I finally asked him upon what information he based his extraordinary remarks. He replied that a friend of his, an officer in their navy, had visited Annapolis, had thoroughly inspected the Naval Academy, and had talked to the midshipmen in regard to the courses of study pursued and to the amount of time devoted to them. He had made accurate notes of prevailing conditions, and had upon his return written a book of impression with an entire chapter devoted exclusively to the Naval Academy. As further proof he sent to his hotel for the book and later pointed out passages to me which seemed to justify his previous statements. He loaned me the book and upon my return home I sat down to read it.

The chapter on the Naval Academy had been written from notes made in a diary during a visit to Annapolis by the French training ship when the writer was a midshipman. It had not been written, however, until some four or five years later, and, when we consider that, as a rule, the French midshipman is much older than our own, we may assume that the opinions are those of a young officer of

25 or more, and are not likely to subsequent change. In other words, it was not the idle vaporings of a midshipman.

It was apparent at a glance that the midshipmen at the academy had been engaged in their favorite amusement of "stringing" the visitors, and that in this instance it had led to unfortunate results.

It is difficult to say how many French officers have received their sole impression of our academy training from this book, but at least the officers at this dinner have, and in spite of my most strenuous efforts they are still unconvinced that conditions are otherwise.

In order to gauge the caliber of the writer more accurately, I read the entire book and I am forced to admit that his impressions of Washington, Baltimore, New York and other cities with which I am more or less familiar are exceedingly fair and impartial. It is evident, then, that the false impressions received at Annapolis must be put down solely to the fault of the midshipmen—to my own class, I regret to say, for we were first classmen at that time and were detailed to entertain the visiting midshipmen. I remember the visit very plainly—even to the smuggled whiskey and the following results. Had the writer been in the starboard watch which visited us the second day, his impressions would have been different—the whiskey had vanished and even the glasses had been sacrificed in toasts to the President of France.

ANNAPOLIS ROADS, April 21, 19—.

The sun is shining brilliantly from a cloudless sky but a cold north wind is blowing which cuts the face like glass. To go to that long, low coast which lies ahead of us and which apparently contains nothing of especial interest, one must take passage in an open boat and be drenched through with cold, salt spray. No, I'll light my pipe and spend the afternoon in dreaming or in sleep.

However, at 11 o'clock orders came for the port watch to go ashore where the American midshipmen were waiting to show us about their Naval Academy. There was no way of escaping so we resigned ourselves to our fate. Afterwards I did not regret having gone. After an hour's hard pull on the muddy water of the bay we arrived in a small cove in which was anchored ships and boats of every description, of all types and of all epochs—bare decked monitors of Civil War days, dispatch boats from the last Cuban War, pleasure yachts transformed into scouts by the addition of one or two rapid fire guns. One of these yachts had had its mizzen completely carried away by a Spanish shell. The damage had not been repaired and it remained as a relic which was pointed out to us with great pride by the naval cadets. The cadets were waiting for us at the landing and received us pleasantly, though rather coldly, being a little stiff

both in bearing and in conversation. They then took us on a trip about their beautiful school. But they have not found it sufficiently magnificent and imposing, so are constructing another one which is to cost a much greater number of dollars. *Excelsior semper*—that is the American motto. We who wish a school on land would gladly take the present one. We passed along gravelled walks, which cut through a large lawn bordered with trees, where a section of cadets was drilling to the sound of a bugle and a drum. Singular idea, this handling arms to music. It made me think of a circus parade. At the right of the park are the houses of the officers and the professors. Then came the buildings of the school, large, new, and superb. We asked why they were to change them, and were told that these were not sufficiently monumental, they did not impress the stranger with the idea of overwhelming magnificence. However, they are the halls of palaces, large, high and bright, with great window frames and light shades, and with wainscoting of polished teak. In turn we inspected the drill hall, library, gymnasium, and a very complete machine shop. All of these buildings are well heated, well lighted and are kept marvelously clean. In comparison with these even the best kept of our establishments resemble a nest of rats. We next entered the large living quarters of the students and passed along the great white corridor where a cadet with sword and gloves paced back and forth on duty. We received an impression of military bearing and of discipline which we did not expect from our memories of the old *Monongahela*. The students are comfortably lodged, two in a room. Smoking and the use of intoxicating liquors is absolutely forbidden. At 10 in the evening the officer on duty pulls a switch and extinguishes the lights. These are the only juvenile rules in force. Furthermore, following the Anglo-Saxon system, they are left to their own consciences like men. There is no surveillance by the officers, the strongest and the oldest among the cadets are responsible for the discipline.

There is a certain number of examinations provided during the course of the year, but the students are left free to prepare for them when and how they please. The compulsory study of our naval school and the time required to be devoted to a prescribed subject appears to be undreamed of here. The surreptitious breaking of rules and regulations, so highly developed and so glorified in at our school on account of the small, mean ways of the constantly nagging authorities, is here almost unknown. To-day, in one hour, whiskey and cigarettes have been smuggled in—but this is a grand débauche. They also brought in some magazines with pictures showing women in the garb of Eve, but how innocent these were compared to even the less improper of our illustrated papers! Yet when the cadets looked at these they had the same smiles and winks that we would have had some three or four years ago. Some of them would now and then make a coarse or vulgar joke but they were the exception. As a rule they were remarkably reserved upon the subject of women. The inborn respect which they have for women, developed by their custom of associating so much with girls—"spooning," they call it—is, perhaps, one of the causes of this reserve. In their lockers many of them have photographs of their sweethearts. These young ladies are allowed to come visit them and to

walk with them about the grounds. The great amount of time that the cadets devote to outdoor sports also contributes to a great extent to keep frivolous or unclean thought out of their minds.

Besides the regular teams, carefully drilled and trained, which hold up the reputation and fame of the school, every cadet goes in for some form of sport and practices with great enthusiasm. We saw a practice game of football. The officers and students—pell-mell in the crowd. One sees only a tangle of arms, legs, feet, heads and torn sweaters, kicking and being kicked at or knocked down in a squirming heap. In these sports class standing disappears. A cadet may be worthless as a student, yet if he is the captain of a team his prestige is far greater than that of the man who stands first in his class at our schools. Lately, when the football team won in a game over their great rivals—West Point—the ovation which they received upon their return could not have been greater had they been the victors at Santiago. Each player was pointed out to us as he passed as a great hero. They engage in about 10 different branches of sport with a full team for each. *The players devote almost their entire time to practice and it is a marvel how they can learn even the rudiments absolutely necessary in their future careers.* The administration takes care of these teams with special tenderness. They have their own mess hall, drink nothing but water, and are fed on red meat, especially prepared. It is not difficult to understand why these teams are so well looked after—they are the Academy's best advertisement!

The mess halls of the school are scrupulously clean and furnished almost with luxury. Paintings of their sea heroes hang from the walls, and every detail gives the impression that the school is being made as attractive and home-like as possible so that the cadets will not feel as if they are in prison, without comfort and without liberty, but in a happy home where the student can work with pleasure. So that, although they have to remain four years there, the time does not seem so long as in our school, where after two years we are deadly tired of it.

We completed our inspection at the Court of Honor, where all of the cannon captured from the enemy in various wars have been arranged. We saw several old Spanish guns dating from the 16th and 17th centuries, of a greenish bronze, which are very beautiful. In the bay we saw the crews at practice in their long, narrow shells which fairly fly over the smooth water under the impulse of the spoon oars manned by husky looking cadets in bright sweaters, their naked limbs taking on a deep pink glow in the cool evening air. A submarine was playing about them like a madcap dolphin, while here and there trim-looking sail-boats were gliding back and forth across the bay.

This visit to the Naval Academy has given us food for deep thought and we have held many long discussions on board concerning it. For many years in France, the subject of a naval school on shore has been discussed, but always laughed at by the "profaners," those whom we call in naval slang "the elephants." We can now point to Annapolis as a naval school working perfectly—although on shore. The cadets have land with plenty of space in which to breath freely and to take exercises with the restful

background of trees and lawn, instead of eternally going around in a cage, such as the Borda. And close at hand there is the bay for drills and maneuvers on water. From the technical point of view there is the advantage of having plenty of room for the construction of work shops, laboratories and model rooms, which are infinitely better for the instruction of cadets than any number of drawings or even of model machines which are usually stored away in a remote corner between decks. There, while the professor is instructing a class, he can demonstrate with all the different pieces of machinery; if he speaks of a connecting rod, a crank, or a screw, each student can examine this piece at leisure instead of having to draw solely from his imagination. Their laboratories of physics, chemistry, and electricity are simply wonderful, and are splendid examples of all the facilities to be had on shore. Of course it would be a great mistake to imitate them absolutely, as different temperaments and different customs must be taken into consideration. One may criticise the amount of time that they devote to sports. But it is difficult to say which system is better —to spend two hours in hard study after having spent one's overflow of energy in outdoor exercise, or to sit for four hours doing the same amount of work, and waste half of it in dreaming which is the usual result of our intense overwork.

We may also make any amount of fun of the calls and visits that the cadets receive from their "flirts," and my readers may say what they please, but it cannot be denied that it is an excellent method of education. Although Americans are supposed to be lacking in culture, they are far from despising this quality. Perhaps without his "sweetheart" the American youth would grow up coarse and uncouth, but "she" polishes his manners, his language, develops his intelligence and helps him to become a gentleman. Besides, every human being needs affection and tenderness. Take away from a man or a boy this moral pleasure and he will invariably develop in a coarser strain. The American education is far more rational and progressive than ours. At Annapolis, one becomes accustomed to the actual conditions of normal existence instead of being separated from them. *The education is almost too practical, as only the rudiments of knowledge—other than technical—are required.* The cadets have generally the most elementary notions in regard to history, literature, etc. Here is an example of it. As we were passing a group of guns taken from the Spanish, one of our cadets noticed a gun with a "fleur de Lys" and a Latin inscription. Our hosts had shown such ingenuous pride in pointing out their captured trophies that my classmate asked if the gun had been captured from Louis XIV. "Certainly," replied the American cadet, and I am sure that he would have been most surprised had he been told that Louis XIV was a king of France, and that his reply could have hurt our feelings; as it was, we were only amused.

After all, this ignorance may be useful for it helps them to believe that no country has ever been so grand and so powerful as their own, and that they may aspire with absolute conviction to the conquest of the world; and it is not impossible that these ideas may help to a great extent in making them successful.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ACCURATE MEASUREMENT OF TORPEDO RANGES

By LIEUTENANT (J. G.) FRANCIS S. CRAVEN, U. S. Navy

HISTORY

The method of checking up torpedo ranges hereinafter described has the following advantages over any other method:

(a) It is independent of navigational marks on shore—hence of charts.

(b) The entire range can be checked with the ship in one location.

(c) The observations to check the entire range can be taken in 15 minutes.

(d) The method is accurate to within 10 yards for ranges up to 4000 yards.

The method is entirely geometrical, and can be used in any locality.

MATERIAL REQUIRED

In order to use the method with the greatest accuracy and facility, the following are required:

(a) One vessel of known water-line length.

(b) One small boat to occupy end buoy of range.

(c) Three sextants of known I. C.

(d) One ship's pelorus, set with 0° at the ship's head. The position of the pelorus should be accurately marked by a white strip of bunting over the wing of the bridge.

(e) Ship's whistle.

OBSERVERS

In the motor boat:

Observer D—with most accurate sextant.

Observer B—with sextant.

On the bridge of vessel:

Observer A—with sextant.

Observer C—with pelorus and to operate ship's whistle.

STATIONS

Small boat occupies end buoy of range (firing point buoy). This should be done as accurately as possible. If the buoy is well anchored, secure directly to it. Vessel steams off from small boat at, approximately, right angles to the range, to a distance somewhere between 960 yards and 1500 yards, stops, and heads "up range." Set alidade of pelorus to point directly on beam toward small boat. Vessel gives "stand by" signal, and maneuvers so as to bring small boat to bear on alidade without shifting ship's position much.

SIGNALS

"Stand by"—toots on whistle.

"Make observations"—one long blast.

"Make next observation on number — buoy" (indicating buoy from the small boat by serial number, the firing buoy being number zero), one long blast followed by toots to the number of the buoy.

"Discontinue and return to ship"—three long blasts.

OBSERVATIONS

When vessel attains position with small boat bearing on alidade, distant about 1200 yards give signal for "make observations."

Observer A measures the angle "*A*" subtended between the firing buoy (#0) and the buoy being observed. Records angle to least count.

Observer B measures the angle "*B*" subtended between the buoy being observed and the position of the alidade on the bridge, which should be marked. Records angle to least count.

Observer C gives signal to "make observations" when small boat bears on alidade.

Observer D measures very accurately the angle "*D*" subtended by the ship's water-line length. Records to least count of his sextant. He should use sextant telescope in making observations.

Record for each observation the following data:

(a) Date and time.

(b) Number of observation.

(c) Title letter of angle observed.
(d) Amount of angle.
(e) I. C. of sextant.
(f) Corrected angle.
(g) Range buoy being checked by that observation.
(h) Name of observer.

Stand by for next observation. Three should be taken for each buoy distant over 2000 yards, worked out independently, the average of three results being accepted.

COMPUTATIONS

1. BASE-LINE

The base-line (x) is calculated from the angle "D" and known characteristics of the ship. To derive the formula, we first refer to the accompanying sketch (Fig. 1).

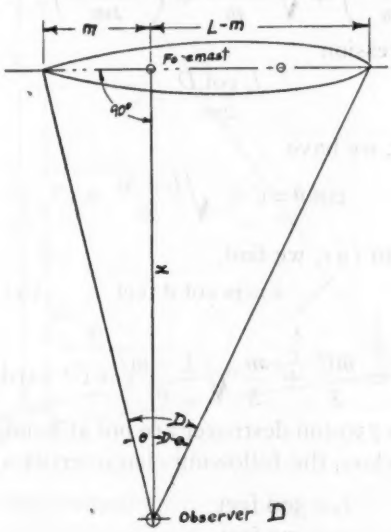


FIG. 1

L = length between perpendiculars of the vessel, in feet.
m = distance from pelorus to forward perpendicular, measured parallel to the keel, in feet.

We have:

$$x = M \cot \theta = (L - M) \cot (D - \theta) \text{ feet} \qquad (a)$$

$$\cot \theta = \frac{L - m}{m} \cot (D - \theta) \qquad (b)$$

By trigonometry:

$$\cot(D-\theta)=\frac{\cot\theta\cot D+1}{\cot\theta-\cot D} \tag{c}$$

Then:

$$\cot\theta=\frac{(L-m)(\cot\theta\cot D+1)}{m(\cot\theta-\cot D)} \tag{d}$$

$$m\cot^2\theta-m\cot\theta\cot D=(L-m)\cot\theta\cot D+(L-m)$$

$$m\cot^2\theta+\cot\theta\cot D(-m-L+m)=L-m$$

$$m\cot^2\theta-\cot\theta(L\cot D)=L-m$$

$$\cot^2\theta-2\cot\theta\left(\frac{L\cot D}{2m}\right)=\frac{L-m}{m}$$

$$\cot^2\theta-2\cot\theta\left(\frac{L\cot D}{2m}\right)+\left(\frac{L\cot D}{2m}\right)^2=\frac{L-m}{m}+\left(\frac{L\cot D}{2m}\right)^2$$

$$\cot\theta-\left(\frac{L\cot D}{2m}\right)=\sqrt{\frac{L-m}{m}+\left(\frac{L\cot D}{2m}\right)^2}$$

$$\cot\theta=\left(\frac{L\cot D}{2m}\right)+\sqrt{\frac{L-m}{m}+\left(\frac{L\cot D}{2m}\right)^2}$$

Calling the expression

$$\frac{L\cot D}{2m}=C \tag{e}$$

and substituting, we have

$$\cot\theta=C+\sqrt{\frac{L-m}{m}+C^2}$$

Referring back to (a), we find,

$$x=m\cot\theta \text{ feet} \qquad \text{(a)}$$

Then:

$$x=\frac{mC}{3}+\frac{m}{3}\sqrt{\frac{L-m}{m}+C^2} \text{ yards} \tag{1}$$

The data for a 750-ton destroyer are not at hand, but for a vessel of the 1000-ton class, the following characteristics obtain:

$$L=300 \text{ feet}$$

$$m=70 \text{ feet}$$

$$C=\frac{30\not{\phi}\cot D}{2\times 7\not{\phi}}=2.143\cot D$$

$$C^2=4.59\cot^2 D$$

and the formula becomes:

$$x=50\cot D+23.33\sqrt{3.286+4.59\cot^2 D} \text{ yards} \tag{2}$$

This formula lends itself readily to the construction of a curve with values of (x) as abscissæ, and values of the angle (D) as ordinates. See graph at end of article.

II. POSITION OF BUOY

The position of the buoy, being observed, is readily determined by solving the simple triangle shown in the sketch (Fig. 2).

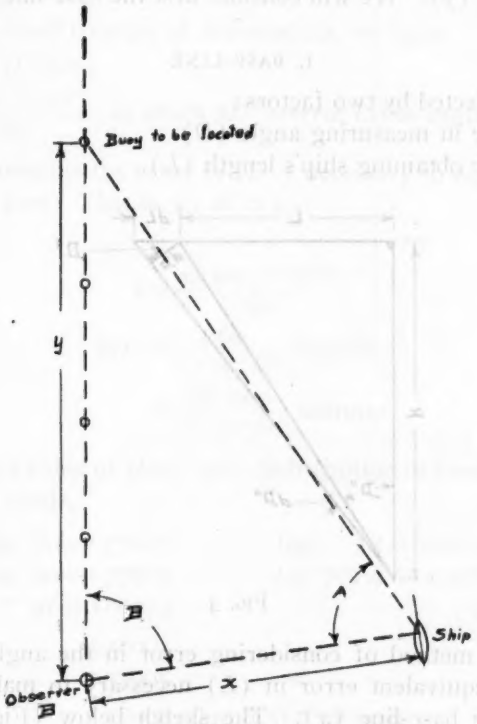


FIG. 2

We have, by trigonometry,

$$\frac{\sin A}{\sin(180-(A+B))} = \frac{y}{x} \tag{f}$$

and

$$\sin(180-(A+B)) = \sin(A+B) \tag{g}$$

Then:

$$Y = \frac{x \sin A}{\sin(A+B)} \tag{3}$$

ACCURACY

In considering the use of the method an important point is its probable accuracy. This accuracy depends on the accuracy of observing the angles (AB) and especially on the accuracy with which the base-line (x) is determined, as the error of the base-line is multiplied by the factor $\left(\frac{y}{x}\right)$ in its effect on the determination of the range (y). We will consider first the base-line (x).

I. BASE-LINE

This is affected by two factors:

(a) Error in measuring angle (D).

(b) Error obtaining ship's length (L).

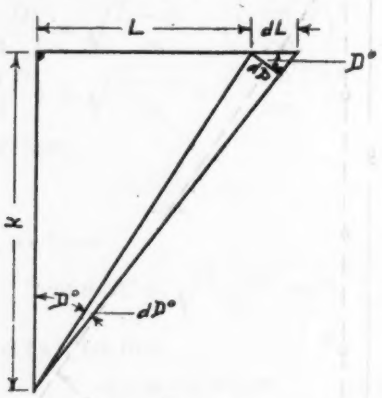


FIG. 3

A simple method of considering error in the angle (D) is to obtain the equivalent error in (L) necessary to make the same error in the base-line (x). The sketch below (Fig. 3) is not strictly accurate, as the triangle of the base-line is not right angled (see Fig. 1), but the assumption will not interfere with a practical determination of the relative errors in (D) and (L).

In the sketch,

L = ship's length.
D = angle (D).
dD = error in measuring angle (D).
dL = equivalent errors in assuming length (L).
x = base-line, in yards.

To get a relation we must express dD in the same terms as is dL (in feet). The angle (dD) subtends a small length of the circumference of a circle whose radius is x yards $=3x$ feet. The circumference is $2\pi x$ yards $=6\pi x$ feet, and 1° subtends $\frac{6\pi x}{360}=\frac{\pi x}{60}$ feet. (h)

Then:

$$dD(\text{feet})=\frac{\pi x dD^\circ}{60} \qquad \text{(i)}$$

From the small triangle of differentials, we have

$$dL=dD\sec D(\text{feet}) \qquad \text{(j)}$$

$$=\frac{\pi x\sec D^\circ dD^\circ}{60}\text{, in which } dD^\circ=\text{error in the angle } (D^\circ) \qquad \text{(k)}$$

Let us determine the error in (D°) necessary to equal an error in (L) of 1 foot. That is, let $dL=1$.

Then:

$$1=\frac{\pi x\sec D^\circ dD^\circ}{60}$$

$$dD^\circ=\frac{60}{\pi x\sec D^\circ}\text{ degrees}$$

$$=\frac{60\times 60}{\pi x\sec D^\circ}\text{ minutes}$$

Let us use a value of $D=7^\circ 30'$. Substitution in Formula 1 gives us $x=761.9$ yards.

$$\begin{array}{rlrl}
\log\ 60 &= 1.77815 & \log\ 3.1416 &= 0.49715\\
\log\ 60 &= 1.77815 & \log\ 761.9 &= 2.88190\\
\log\sec\ 7^\circ 30' &= 0.00373 & & \overline{3.37905}\\
& \overline{3.56003} & & \\
& \overline{3.37905} & & \\
& .18098 = \log\ 1.517 \text{ minutes} & & \\
& \overline{\qquad 60} & & \\
& 91.020 \text{ seconds} = & &
\end{array}$$

Equivalent error in angle (D) to error of 1 foot in length (L) } 90 seconds (4)

In considering the effect on the base-line (x) of an error in length (L) we find the following sketch of use (Fig. 4):

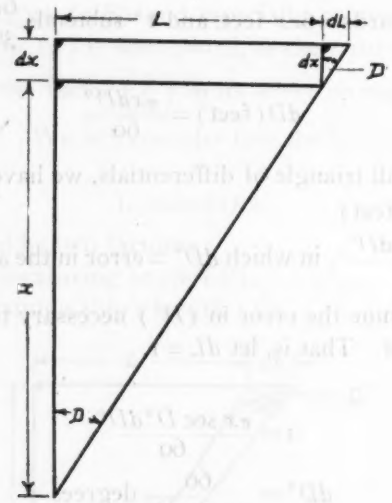


FIG. 4

Symbols as in Fig. 3, so far as they apply.
dx = error in base-line (x) caused by an error (dL) in length (L)
We have:

$$dx = dL \cot D \tag{1}$$

Let

$$dL = 1 \text{ foot, and angle } D = 7.5°$$

Then:

$$dx = \cot(7° 30') \text{ feet}$$

$$= \frac{\cot 7° 30'}{3} \text{ yards}$$

$$\log \cot 7° 30' = 0.88057$$
$$\log 3 = 0.47712$$
$$0.40345 = \log 2.532 \text{ yards}$$

Then an error of 1 foot in the length (L) will cause an error of 2.532 yards in the base-line (x). (5)

Recapitulating, it should be possible to observe the angle (D) to within 30″ by using the sextant telescope. This error then would be equivalent to $\frac{30}{90} \times 1 \text{ foot} = 0.333$ foot error in determining the length (L). The actual error in determining this length for computation should never exceed two inches, making a combined possible error, if both were in the same direction, of ½ foot in the length (L) and therefore of 1.25 yards in the base-line (x). (6)

II. FINAL DETERMINATION

In the triangle of the range (see Fig. 2) the error produced in the range determination by an error (dx) in the base-line (x), is in accordance with relation:

$$\frac{dy}{dx} = \frac{y}{x} \qquad \text{(m)}$$

$$dy = \frac{y}{x}\, dx$$

Considering the extreme case of checking up the point-of-aim buoy (4000 yards):

$$y = 4000 \text{ yards}$$
$$x = 761.9 \text{ yards}$$
$$dx = 1.25 \text{ yards}$$

Then:

$$dy = \frac{4000 \times 1.25}{761.9} \qquad \text{(n)}$$

$$\log 4000 = 3.60206$$
$$\log 1.25 = 0.09691$$
$$3.69897$$
$$\log 761.9 = 2.88190$$
$$0.81707 = \log 6.5625 \text{ yards}$$

Maximum error in final determination due to base-line is 6.5625 yards. (7)

Angles A and B lend themselves readily to accurate measurement. The error in either one should not exceed 30″. As the angle (B) is approximately 90°, it is evident that error in observing

the angle (A) will have the greater effect. If we consider the error due to errors in both (A) and (B) as double that due to (A) we will then be on the safe side. The sketch (Fig. 5) indicates an error of $(dA°)$ in measuring the angle (A) and the equivalent error (dz) in the base-line (x) to produce the same error in the determination of (y).

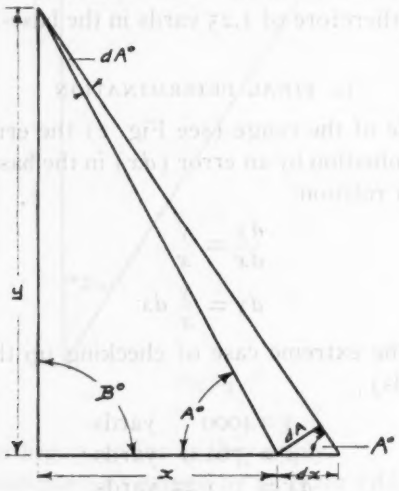


FIG. 5

$$dA = dx \sin A \tag{o}$$

$dA°$ = subtends part of a circumference whose length is $2\pi k$ yards.

The part subtended by 1° is

$\frac{2\pi k}{360} = \frac{\pi k}{180}$ yards, and the part subtended by

$$dA° = dA = \frac{\pi k dA°}{180} \tag{p}$$

To eliminate (k), we have by trigonometry:

$$\frac{k}{x} = \frac{\sin B}{\sin(180 - A - B)} = \frac{\sin B}{\sin(A + B)} \tag{q}$$

$$k = \frac{x \sin B}{\sin(A + B)}$$

$$dA = \frac{\pi x \sin B dA°}{180 \sin(A + B)} = dx \sin A$$

$$dx = \frac{\pi x \sin B dA°}{180 \sin A \sin(A + B)} \tag{r}$$

Letting $dA^\circ = 30'' = \frac{1}{120}$ degree, and $x = 761.9$ yards, we have:

$$dx = \frac{1 \times 761.9\pi \sin B}{120 \times 180 \sin A \sin(A+B)}$$

By letting $B = 80^\circ$ and substituting in Formula 3 along with values of $(x) = 761.9$ and $(y) = 4000$, we get

$A = 89^\circ\ 01'$ $A+B = 169^\circ\ 01'$

$\log 120 = 2.07918$	$\log 761.9 = 2.88190$
$\log 180 = 2.25527$	$\log n = 0.49715$
$\log \sin A = 9.99994$	$\log \sin B = 9.99335$
$\log \sin(A+B) = 9.27995$	3.27240
3.61434	3.61434

$$\log dx = \log 0.45505 = 9.65806$$
$$= 0.46 \text{ yard} \qquad (s)$$

Then the equivalent error in the base-line (x) to an error of $30''$ in observing the angle (A) is 0.46 yard. Double this is 0.9 yard, the total error that can result from the angles (A) and (B). The effect of 0.9 yard error in (x) on the final determination of (y) is readily determined from (5) and (7) as follows:

$$\frac{dy}{dx} = \frac{6.5625}{2.5} \qquad (t)$$

$$dy = \frac{6.5625 dx}{2.5} \Big\} \; dx = 0.9 \text{ yard}$$

$$= \frac{6.5625 \times 0.9}{2.5}$$

$\log 6.5625 = 0.81707$

$\log 0.9 = 9.95424$

0.77131

$\log 2.5 = 0.39794$

$0.37337 = 2.3625$ yards

Total error due to errors in observing angles (A) and (B) should not exceed 2.4 yards. (8)

Recapitulating, we have:

Error caused by (dx)	5.6 yards	(7)
Error caused by (dA°) and (dB°)	2.4 yards	(8)
Total error, all causes	8.0 yards	(9)

It must be realized that these errors exist in any one set of observations. If three sets are made by any one set of observers and each is worked out separately, the mean of their results should be very close and well within the limit of 10 yards.

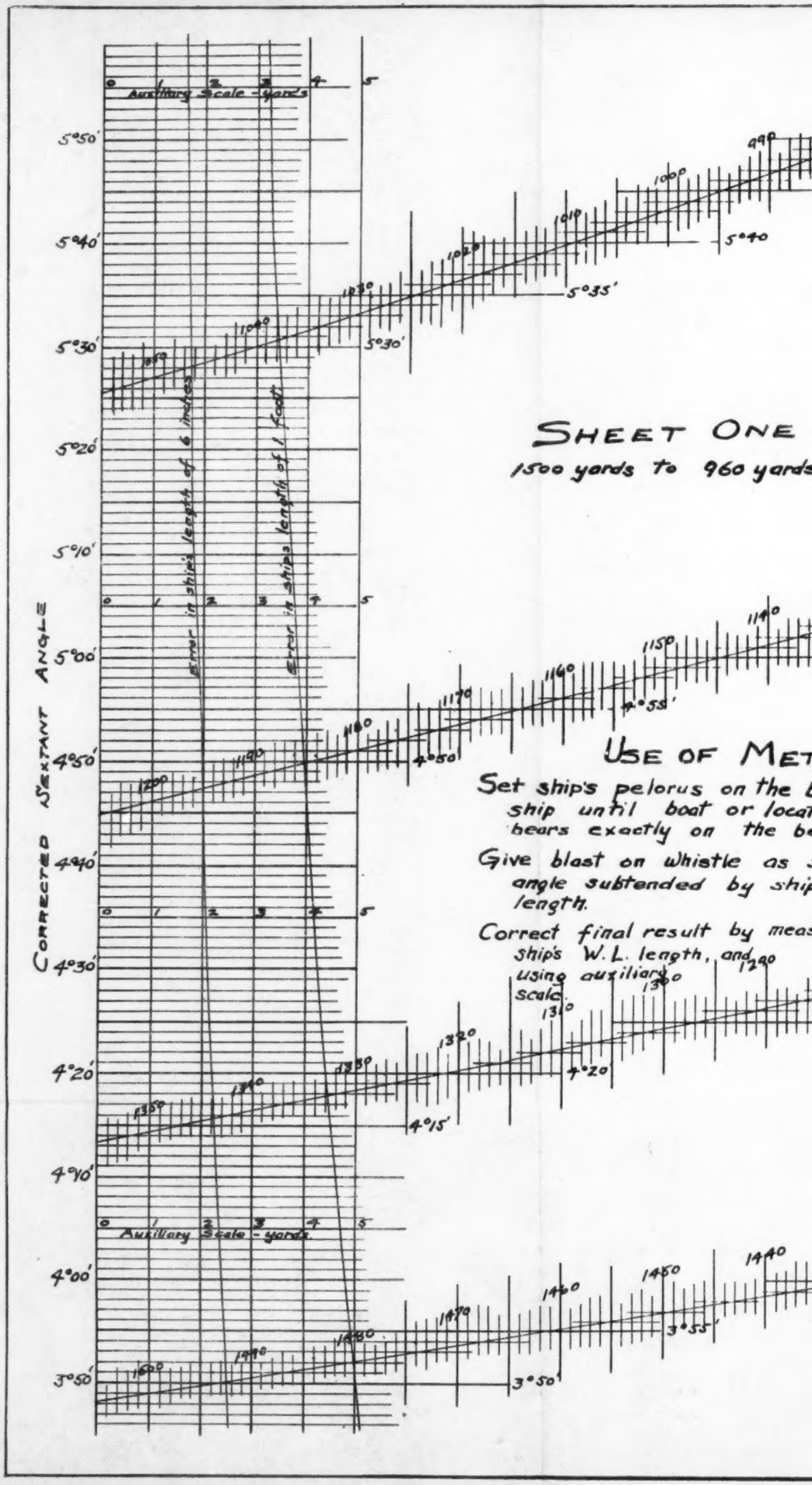
NOTE.—The appended graph may not be used for vessels which have not the following characteristics:

$$\frac{\text{Horizontal distance — pelorus to water-line at bow}}{\text{Water-line length}} = 0.2335 \qquad (1)$$

For vessels of these characteristics, but with a water-line length other than 300 feet, the curve may be used if the result obtained is multiplied by the expression:

$$\frac{\text{Vessel's actual water-line length, in feet}}{300 \text{ feet}} \qquad (2)$$

The vessels of the *McDougal, Benham* and *Nicholson* classes may use this curve without modification.


Auxiliary Scale - yards
Error in ship's length of 6 inches
Error in ship's length of 1 foot
Corrected Sextant Angle
5°50'
5°40'
5°30'
5°20'
5°10'
5°00'
4°50'
4°40'
4°30'
4°20'
4°10'
4°00'
3°50'
5°40
5°35'
5°30'
4°55'
4°50'
4°20
4°15'
3°55'
3°50'
SHEET ONE
1500 yards to 960 yards
USE OF MET
Set ship's pelorus on the b
ship until boat or locat
bears exactly on the be
Give blast on whistle as
angle subtended by ship
length.
Correct final result by meas
ship's W.L. length, and
using auxiliary
scale.

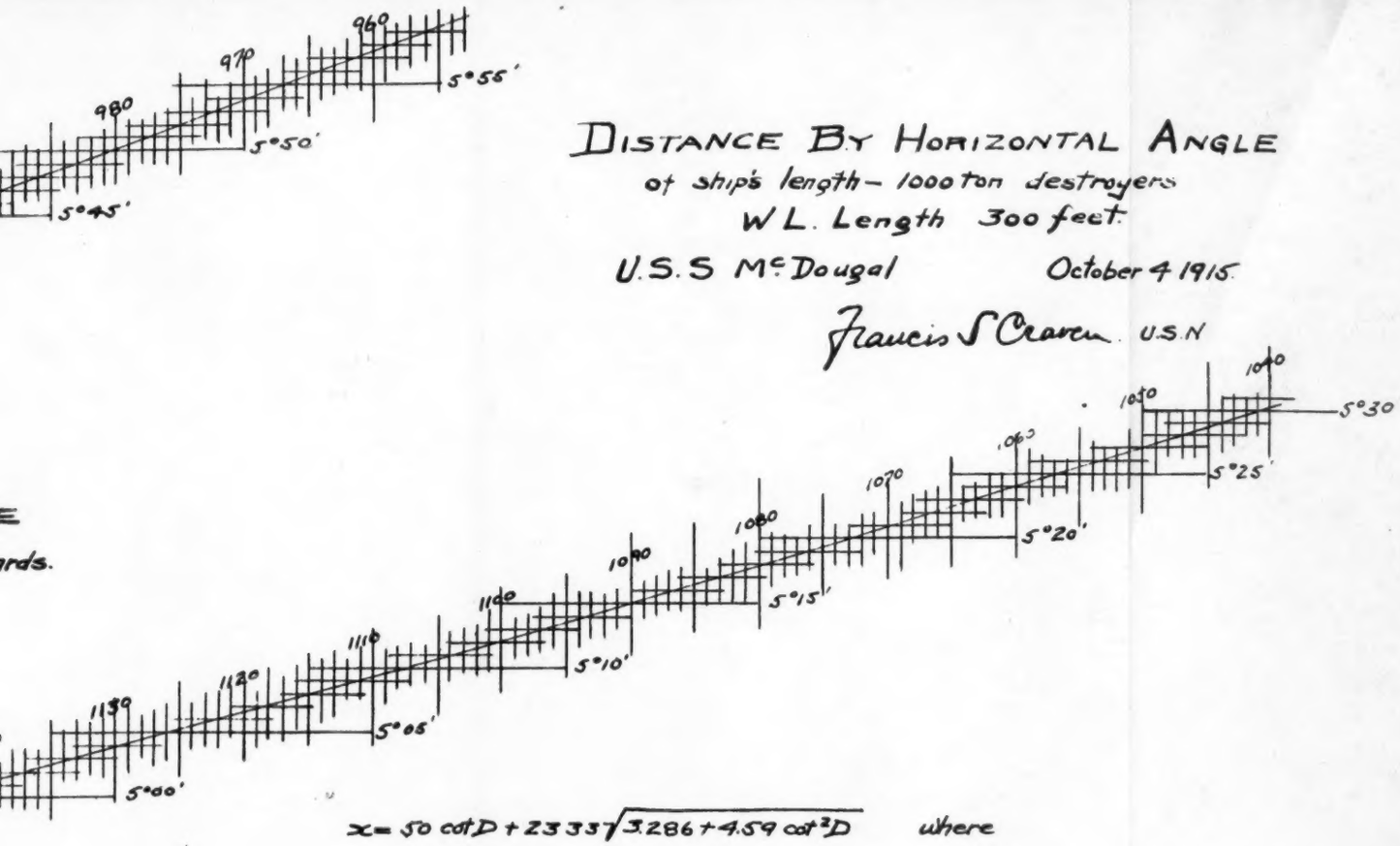
Distance By Horizontal Angle

of ship's length – 1000 ton destroyers

W.L. Length 300 feet.

U.S.S Mc Dougal October 4 1915.

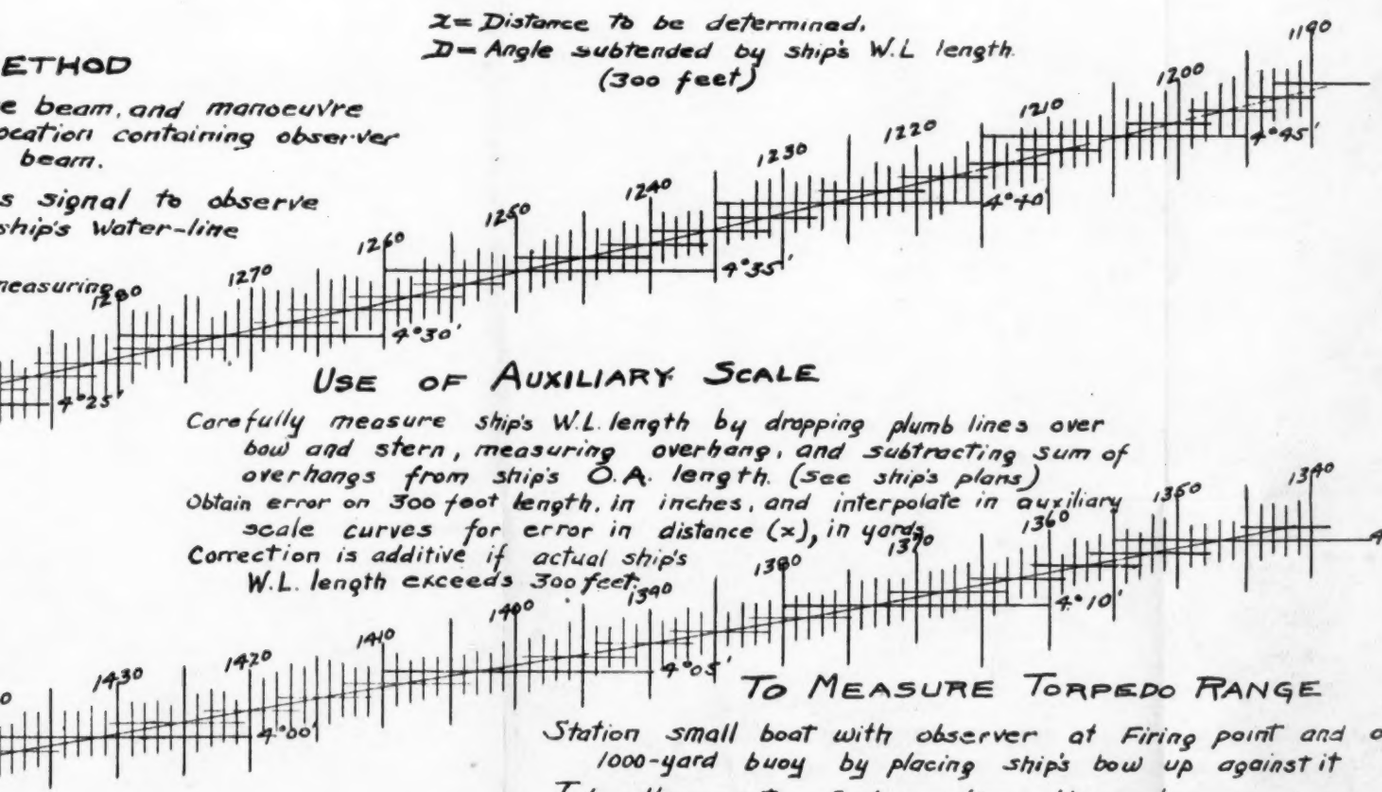
Francis S Craven U.S.N



$$x = 50 \cot D + 2333\sqrt{3.286 + 4.59 \cot^2 D}$$ where

x = Distance to be determined.

D = Angle subtended by ship's W.L length (300 feet)



Use of Auxiliary Scale

Carefully measure ship's W.L. length by dropping plumb lines over bow and stern, measuring overhang, and subtracting sum of overhangs from ship's O.A. length. (See ship's plans)

Obtain error on 300 foot length, in inches, and interpolate in auxiliary scale curves for error in distance (x), in yards.

Correction is additive if actual ship's W.L. length exceeds 300 feet.

To Measure Torpedo Range

Station small boat with observer at Firing point and occupy 1000-yard buoy by placing ship's bow up against it

Take three sets of observations, then observer occupy 1000-yard buoy and ship occupy 2000-yard buoy.

Take three sets of observations again, and then shift for next thousand yards, repeating performance until range is covered. Correct final results using auxiliary scale

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE ROMANCE OF JOSHUA BARNEY[1]

By COMMANDER T. D. PARKER, U. S. Navy

"Barney? Name sounds familiar. Why there's a tinclad named after him!"

"What'd he do?"

"He— ah— Excuse me! I've got to shove this boat off."

We all admit that Joshua Barney was a "naval hero." But how many know those brilliant, romantic details of his life that would make a best-seller or a moving picture thriller? The story may mean much to Young Turks, for Barney's great military character was made largely by "rubs of the green" in subordinate billets.

Like Paul Jones he lived a war too soon, and like Cushing he was too young: but few ensigns or fleet commanders ever lived more deeply.

His father, a gentleman farmer, was blessed with a large family in which Joshua came fifth. Born in old Baltimore Town in 1759—a stirring year in Colonial history—he left school at ten, spent a year in the counting house and *at eleven,* at his own strong wish, went to sea. Hoping to cure him of sea-fever, his parents insisted on his spending a year on a pilot boat; but at the end of the year he was keener than ever, so that his father, yielding wisely, apprenticed him to a son-in-law, Captain Drysdale, master of a small brig.

Barney's first long voyage was to Liverpool. Returning, his joy was suddenly checked. He found his family plunged in woe—since, a few days before, a younger brother had accidentally

[1] For the facts of this article, the writer is indebted to the "Memoirs of Commodore Joshua Barney," edited by his daughter-in-law, Mrs. Mary Chase Barney; "The Pictorial History of the American Navy," by John Frost; Cooper's Naval History; Maclay's Naval History and "History of American Privateers"; and an interesting sketch of Barney by Mr. M. T. Weller in the Records of the Columbia Historical Society (Vol. XIV).

shot his father dead. Some days later (Barney's stays at home were brief) Drysdale summoned him for another trip—on the *Sidney*, of 300 tons. After several voyages he was such a good seaman that, though still an apprentice, he was made second mate of the vessel—a convenient arrangement for the skipper, who pocketed the extra pay. In December, 1774, Barney, just turned fifteen, sailed for Nice. The *Sidney* was deeply laden with wheat.

And here the Romance begins. Just outside the Capes of the Chesapeake the ship sprung a leak and was forced back to Norfolk. There the first mate quarreled with old Drysdale—who never said "if you please"—and left the ship. They put to sea; the leak got bad again; and the captain, taking sick, died within a week. Barney, boy of fifteen, found himself responsible for a deep-sea-going ship a crew of "grown people," a valuable cargo, to put across the ocean—and the leak. His first act was to man the pumps; but the leak grew worse, and a great gale of wind on the other side laid the wide seams open. In desperation they just managed to make Gibraltar.

The port officials stared. "By gad, sir! What have we here? Does this shaveling call himself captain?" But Barney was a boy of action. Though without funds, he persuaded the firm of Murray and Company to advance the cost of repairs (some $3500), taking as security a "bottomry bond," executed by Barney and payable ten days after arrival at Nice—and got permission to haul the *Sidney* into the King's Dock. In three months all was tight, and he was off for the Riviera, with young Mr. Murray aboard. When he arrived, the merchant consignees tried to wriggle out of the debt, on the technical plea that Barney was a minor. However the minor's view was different. He insisted on payment and held up delivery of the cargo.

The merchants thought it easy to browbeat a child, and were enterprising. They appealed to the Governor not to let good money leave Nice; and that patriot ordered Barney to hoist out the grain at once. Barney, in his youth and folly, declined. The Governor stormed, and ordered him to leave the presence, which Barney smilingly did. At the foot of the stairs he was arrested by a file of soldiers, and thrown into a filthy prison. A few hours there made him see light. Pretending to yield, he told the Governor that he was ready to whip out wheat. He was at once

released, and returned to the *Sidney* with an official who was to see the majesty of the law upheld.

Barney hoisted his British flag.

"I yield to superior force," he told the officer. "But you see that flag. No use later to say you didn't know what country you were insulting!"

This insurgent then put his crew aboard another British ship; and at once proceeded, in company with Mr. Murray, to cross the mountains and seek out the British ambassador at the court of Naples.

The "appreciation" of the Alps in his journal has become famous. Lack of space does *not* prevent its insertion here:

"We crossed the famous Alps, so noted for snow and difficult traveling, on mules, we passed through part of Switzerland, and arrived at Milan."

If Barney was not poetical he was at least convincing; for he got Sir William Lynch, the British ambassador, properly furious and busy. The result was a triumphal return to Nice. The Governor, like the Prodigal's father, saw him afar off, met the little party outside the city, escorted them back with high honors, paid all expenses of the trip, saw the bond promptly paid, called officially on Barney, humbly apologized—and asked what else he could do. Barney declined any further reparation.

Doubtless the Governor said in his heart, like the cross Mr. Kipling after his voyage with an American boy:

"And now I want to see the little American *girl*—but not yet, not yet awhile!"

The young captain was still in the danger zone. His next port was Alicante, Spain, where arriving just at the wrong time, he found a great expedition fitting out to crush the Barbary States and was impressed into transport service. This great attack by an Armada, with 30,000 troops resulted (unlike our little expedition under Preble!) in bickerings and disaster. The *Sidney* at last sailed for home.

The long, eventful voyage ended, Barney dropped anchor in Baltimore Harbor, and papers in hand, pulled ashore. We know how he felt—how green the grass looked, how pink the faces under old-time bonnets, how fascinating the busy street-life. Child no longer, with bronzed face forcefully lined by responsibilities well

borne, he hurried to the dingy counting house, where the Senior Member was doubling over figures.

The old man looked at Barney under his spectacles.

"Who are you, sir?"

"I am Joshua Barney, master of your ship *Sidney* just arrived."

"Master of my ship—and how dare you, sir, an apprentice boy presume to take command of a ship of mine?"

Barney disdainfully threw his pile of papers on the desk and walked to the window. "Read those," he said. The merchant picked them up with a grunt—read, and read on, with constantly growing amazement. Finally he arose, seized the young seaman's hand with both of his, and exclaimed:

"Captain Barney, you are welcome home, sir! Your conduct meets my cordial approbation, sir, and I am proud to find that I have so deserving a young man in my employ."

This ended Barney's peaceful boyhood. The death of Drysdale had annulled his apprenticeship. Entering the Chesapeake, on his homeward voyage, he had heard of the "embattled farmers." After a few days at home, he offered his services to the Colony—and for the next six years was never far from burning powder.

His adventures would make material for many articles. One can only skim over them, pausing at the more remarkable. Few naval men ever had more downright fighting. A bout to the finish between Barney and Paul Jones would have been the last word in frenzied fighting.

He began war service on the *Hornet*, 10 guns, fitted out by the Colony of Maryland and commanded by one Stone, of Bermuda, whose name will not ring through the ages. After some unmolested cruising, Stone "smelt the blood of an Englishman." A British tender of inferior force bore down to capture the seeming merchantman; for the guns were in. Barney, running one out, stood match in hand, ready to fire—when Stone appeared and, remarking that "he had no inclination for shedding blood," ordered Joshua not to fire. Barney was so furiously indignant, that, forgetting discipline, he hurled the matchstick at the captain. Stone dodged, and it lodged in the poop-house. Meanwhile the tender found she had flushed big game, and putting about, escaped. Stone kept to his cabin for the rest of the trip, and left in haste on arrival at Philadelphia. He was one of the first Pacificists.

Since Stone had to hurry on without preferring charges, Barney's standing remained excellent; he next served on the sloop *Wasp*, Captain Alexander, where he saw good fighting. They were instrumental in saving a valuable cargo on the brig *Nancy* attacked by two British ships, and later by their boats. The boat attack was disastrous for the enemy; Captain Barry, in abandoning the ship, rigged up a fuse to the remaining cargo, powder—and the unlucky invaders went up in smoke!

The result of the glory won on this cruise was Barney's commission as a lieutenant in the Colonial Navy, and orders to the sloop *Sachem* (10), Captain Robinson. On July 6, 1776, his seventeenth birthday, the young lieutenant sailed on her. The birthday party (a day or two later) was a stiff fight with a British letter of marque, which was duly captured. Captain Robinson and Barney were promoted to the fine new brig *Andrea Doria* (14), which received, at St. Eustatia, the first salute to the American flag—a salute for which the Dutch governor lost his "head." Following this was a fight with the *Racehorse* (12), sent to capture the *Doria*—in which, through some miscalculation, the *Racehorse* was taken. Some days later they captured a snow[1] of 6 guns, and Barney went aboard as prize-master. A furious Christmas gale set the prize among the breakers of Chincoteague Shoals, where, while seas broke over them, death seemed near. Barney then spoke a few words:

"I am not much of a chaplain, my good lads—but this I know, that the same Power that protected you before can protect you now, and if we are all to go to old Davy Jones' locker, why damn it! we might as well go with a bold face as a sheepish one."

They escaped; but only to be captured (after Barney had quelled a mutiny of British sailors) by the *Perseus* (20), Captain Elphinstone. This was the first of various captivities.

An incident occurred on the *Perseus*. Her purser wrought up by the tales of some paroled British prisoners, smashed the face of the first American in reach, who happened to be the prisoner Barney—the wrong man! Barney knocked him over a gun and kicked him down the hatch. At this moment Elphinstone came up. Being an officer and a gentleman, he rebuked the purser severely and apologized to the prisoner. Soon afterwards Barney was paroled, and landing at Charleston, started overland for Philadelphia.

[1] See appended note, p. 1250.

In North Carolina he passed through a hostile district peopled by Scotch Tories. One afternoon, in a country inn, his party was baited by a mob of young rustics whose wit was very insulting. Being hopelessly outnumbered, the patriots did nothing; but in the dead of the night Barney secured some "lightwood knots" and a bottle of rum, and slipped off, with his friends, to a house where four of the village cut-ups were sleeping. With blazing torches and terrible cries they roused the Tories, convinced them that the whole Whig army was on them, stampeded and captured them, lined them up and made them drink, with fear in their hearts "To the Continental Congress!" "Down with King George!"—and to other selected toasts.

We next find Barney in command of a Baltimore tender. One day a trick was played on him. He was decoyed within range of a large American sloop that the British had just captured, and was astonished to find an enemy barge, full of grinning jackies, concealed on the other side. However he turned-to and captured both sloop and barge.

Not long afterwards the *Virginia*, Captain Nicholson, on which Barney was serving as lieutenant, was injured through grounding, abandoned by her captain and seized by the enemy. Barney wanted to show fight, but was overruled by faint hearts—and found himself again in captivity.

He was sent to New York on the *St. Albans*, and treated well by her Captain Onslow—even after his plot to capture the ship was foiled through the treachery of a Frenchman. It is important to note the stamp of men like Elphinstone and Onslow—for there were others! At New York he got a taste of the horrible prison-ship life (on the *Jersey*), but was later removed to the flagship of Admiral Byron, who treated him as a highly privileged prisoner. Barney's own reputation for humanity had been excellent. He did not believe in "frightfulness."

After half a year lost, he was exchanged, and in February '79, crossed on a letter of marque, under his old captain, Robinson, to Bordeaux. They fought a hard battle going and another returning—and added two victories to their string. In one case Barney turned the scale by blazing away at the enemy's rigging with a full load plus a crowbar. In October, 1779, he returned to Philadelphia.

So far this romance has lacked a heroine. But during the winter of '79 Barney took a holiday, and found time to win and marry Miss Ann Bedford, daughter of a Philadelphia alderman. Poor little bride with her naval hero!—she did not know what her luck was to be. Half a year later her sailor was at sea, on the *Saratoga*. *En route* he was robbed of his little pile of prize money —a serious matter for a man just married, with two years' pay due and unpaid.

But the *Saratoga* ran down prizes quickly—a fine ship and three brigs in two days. Financial sunshine seemed at hand for the young Barneys. Moreover Joshua was placed on one of the prizes to return to Philadelphia, where his bride was waiting with laurel and kisses.

At night he found five feet of water in the hold; in the morning he was recaptured by the *Intrepid* (74). The captain's name should hang in letters "as high as Haman"—A. J. Pye Malloy. The tryst with Ann Barney was postponed.

Malloy kept Barney on deck, scantily clothed, without bedding, almost freezing, until, after a stormy winter passage, the ship reached New York. There he fell into the stern hands of Rodney, and was despatched, with seventy other American *officers,* to be hanged as "rebels" in England.

The captain of the ship, the *Yarmouth* (74), was one Lutwidge, who afterwards became an admiral, and died, no doubt, prosperous and highly respected. Strange that Elphinstones, Onslows, Malloys, and Lutwidges, can be fruits of the same tree!

Lutwidge had fun with the rebels. He put them down five decks in a hold 12 feet by 20 and 5 feet high, in which it was impossible to stand up. They were 30 feet below the water line with little air and no light. Their food was nauseous and insufficient; the slimy water had to be drained between their teeth. *Sanitary provision was wholly lacking.* When pestilence resulted, medical attendance was refused, and eleven poor fellows died raving. The survivors concealed each death as long as possible in order to get the dead man's food. When after a voyage of *fifty-three days* the *Yarmouth* reached Plymouth Town, the sixty prisoners were hoisted from the hold—they could not walk—and fell in a ludicrous heap on deck—for they could not stand. The glare of sun-light was insufferable. It was deemed well to feed them up a bit before sending them ashore.

Such were the Lutwidges of that 18th Century Rebellion.

As soon as they were able to walk, the prisoners were taken to Mill Prison. The inner prison was surrounded by a high wall; this, in turn, by another.

The story of Barney's escape is one of the most romantic in his career. Somehow he procured a British officer's uniform (perhaps the cruel gaoler had a daughter). Pretending to sprain his ankle playing leap-frog with other prisoners, he hobbled about for several days with his overcoat on "to avoid catching cold." The sight of the overcoat became quite natural. Through a well-disposed sentry who had received kindnesses in America, Barney learned that the best time for the attempt would be the dinner-hour when the gaolers would be eating and his friend on post. He made arrangements accordingly. He donned his British uniform, put the overcoat over it, and limped over towards the gate. "All right?" he asked in a whisper. The sentry winked and turned his back. While Barney's friends engaged the other sentries in conversation, a tall prisoner, who was at hand, gave Barney his back. In a moment he was up and over. He then walked boldly through the second gate, and throwing his overcoat away, strode across the fields like a good Englishman.

But England was no place at this time for a nervous American, or for one with a price on his head. Barney had a start: for he had arranged for a boy prisoner, who could crawl from one lock-up to another, to answer Barney's name in one space after answering his own at another. This the boy faithfully did. The fugitive found friends in the city, and with them two other Americans, not prisoners, who were anxious to get home. Through these two a sail boat was secured; and it was settled that Barney, with his two landsmen, should sail away to France.

Having embarked safely, they sailed out, with beating hearts, past the ships of Admiral Digby's squadron and under the guns of the port. Almost before they realized their good luck, the boat was pitching and rolling in the Channel—and the passengers went below. Barney with a slicker over his uniform, sailed the boat for France, freedom, and home.

A sail on the horizon! Barney looked anxiously, and gazed again, with clammy fear, as the stranger bore down displaying a British flag. It was a privateer. The boarding officer asked Barney what the meaning was—why he was sailing fast towards

the enemy's country. Barney threw back his coat displaying an officer's uniform.

"On the King's business!" he said. "Molest me at your peril."

The officer was taken aback, apologized, and went to report. The shrewd old skipper came aboard. He demanded proof that Barney was on public business. Barney refused to disclose the King's secrets.

"Then, sir, I am sorry—but back you go!"

"As you please," said Barney calmly. "You may have cause to regret your decision. If you persist, I must demand that you put me at once aboard Admiral Digby's flag-ship."

Then he added as if casually, "Those are fine looking bullies in your gig!"

This was not for flattery. As Barney well knew, privateersmen with good-looking crews, did not enjoy visiting the fleet to risk losing them by impressment.

The old seaman scratched his head. Barney held his breath.

"Can't help it" he growled. "I must take you back sir. Please to step aboard."

It is easy to imagine the reaction, the bitter disappointment, the anticipation of returning to Mill Prison for special treatment.

Arriving at an anchorage, the skipper put on his best jacket and boarded Digby's flagship to report, leaving the special envoy, like a trapped animal, to feverishly await the summons to the flagship. He could almost feel the irons on his wrists and ankles.

A small boat was riding astern. Seeing this, as he wandered restlessly about the poop, Barney lost no time in sliding down, and casting off. In a few minutes he was on the beach, politely asking the customs official where "our people" were. He walked rapidly towards the Red Lion, where the liberty party were drinking beer, and out on the highway towards Plymouth, where his friends were. As he walked he glanced anxiously over his shoulder and looked in vain for a good hiding place. He broke into a run. Coming to a hedge he jumped it, and found himself in a large, cool, private garden. He was roughly accosted by the gardener, who wanted to know what business he had in Lord Edgecomb's gardens. Barney made friends with the old man, and gave him a fee. The man showed him down some steps to a butcher's boat, in which, with a few sheep, he made a fine passage to Plymouth, where he reached his friends. He found his late fellow passengers also back. Not being prisoners, they had not been detained.

That night a town-crier came, ringing his bell, and, halting under their windows, proclaimed the escape of the rebel, Joshua Barney. The household were in a panic. But the crier passed on; and the sounds grew fainter and died away.

Barney was next rigged out as a *gentleman,* and provided with a chaise to escape to Bristol. They reached the cobblestones after dark, and suddenly stopped. A lantern was thrust in, and a bailiff read off a description of the escaped rebel. He then looked critically at Barney.

"Beg pardon, sir!" he exclaimed in best cockney style. "'ad to obey orders. Sorry to annoy your worship. Thankee, sir! Pass on!"

After a few more adventures, Barney took passage in a packet for Ostend.

Romance followed him aboard. The saloon was crowded with tradespeople and other uninteresting folk. Barney's quick eye soon picked up a graceful figure alone and somewhat apart—a lady young, handsome, with an indescribable something of elegance and distinction. Her dress, quietly fine like her features, set her off from the rest of the company. Being kind-hearted (like most sailors) he offered assistance, and was of real help to the lady during a rough passage across. On the dock at Ostend was a handsome equipage to meet her. She invited Barney to share her carriage across country to Brussels; he required no urging, and made himself so agreeable, that when at last they drew up before a superb mansion in Brussels, the lady invited him in—and presented him to the Emperor, Joseph II of Austria! Barney then took leave of his fair traveling companion—and after five days in Brussels passed on to Amsterdam. There he took passage for the land he had left on the *Yarmouth.*

Delays were endless in those wind-jamming, rough-riding days. After a long voyage, Barney at last landed in Beverly, Massachusetts, and was snowbound in Boston for several weeks. Declining a flattering command, he finally began the hard overland journey to Philadelphia, to the home he had steered for in triumph eighteen months before.

Imagine his feelings on that last lap of the long journey. During all this time no word from his young wife: for her, no word from him. Was she alive? Was she ill or destitute? Had the war spared her people? Had she cried herself to sleep, night

after night, wondering where he was, or if she would ever see him again?

The 21st of March, 1782. The travelers are gay, for the spires of Philadelphia are gleaming in the distance. They grow nearer; the horses break into a gallop; the guard sounds his horn. Rattling in over the rough stones, followed by urchins and barking curs, the stage dashes down Broad Street and brings up, with a flourish, at Ye Colonial Arms. A traveler descends stiffly, pushes past the bustling servants, and walks rapidly away. He comes to a familiar corner; and with eager steps turns into the street where Alderman Bedford used to live. Is the old house there? Yes—it is standing as he left it. Breathing quickly, he grasps the iron balustrade, mounts the stone steps—and rings. An old mammy comes to the door.

"Is Mrs. Barney here?"

He found his young wife—and a little son of whose birth he had never heard.

Meredith describes a similar touching scene, when Richard Feveril, returning before his fatal duel, finds Lucy in her room, not alone as he left her, but sitting by the cradle of his child.

To my mind, the first Mrs. Barney is one of the pathetic children of history. Marrying for love, she spent her youth waiting for her sailor husband. The years that should have been joyous were full of disappointments and of lonely suspense. Even now, five days after this reunion, Barney was offered command of the *Hyder Ali,* and promptly accepted. In 1808 Mrs. Barney, "who had been sorely afflicted with rheumatism for years," passed away—ending her short life before his later years of rest, wealth, and peaceful comfort. In 1809 Captain Barney was again married to the charming Miss Coale, of Baltimore.

The *Hyder Ali* was a fine command *of 100 tons,* mounting sixteen 6-pounders. She was commissioned by the state of Pennsylvania to stop the depredations of Britishers in Delaware Bay and River. On her Barney fought one of the most glorious single-ship actions of the American Navy. None of the famous victories of 1812 was more complete. On April 8, 1782, while convoying a fleet of merchantmen down Delaware Bay, he saw waiting in Cap May Roads two British ships and a brig. Signaling to the convoy to return, he hove-to, with the desperate intention of saving the convoy at the expense, if necessary, of his own ship. The brig

bore down first; but, giving Barney only a broadside, passed on after the merchantmen. Barney reserved his fire for the first ship, which was fast approaching; and when she came within pistol shot, gave her a heavy broadside. Then by a trick, it is said (roaring reversed orders to the helmsman, who had secret instructions), he caught the Britishers napping, and threw his ship athwart her hawse, so that he could deliver a raking fire. With twenty salvos in twenty-six minutes (a record Sir Percy Scott would be proud of) he smashed the enemy, captured the ship, and rushed a prize crew aboard; for the other ship was looming near. Meanwhile the brig (the *Fair American*) ran aground to avoid capture. Knowing that the second ship (the frigate *Quebec*) far out-classed him, Barney followed the prize and convoy, but kept well in the rear to protect them. The Britisher, finally dropping anchor, signaled to her unlucky consort to "continue the chase!"

Barney now had time to learn (with joy) that his prize was H. B. M. S. *General Monk,* under the command of Captain Rodgers, R. N.

A comparison of forces and losses is interesting: *Hyder Ali,* 110 men, sixteen 6-pounders, 15 casualties. *General Monk,* 136 men, twenty 9-pounders, 53 casualties.

The losses reported by Rodgers were much smaller—but the captor had possession and facilities for a correct count. British writers assert that Rodgers' guns were defective. If so, these defects seem to have passed unnoticed during two years of previous cruising.

Cooper (an ex-naval officer) says, in his Naval History:[1]

"Throughout the whole affair this officer (Barney) discovered the qualities of a great naval captain; failing in no essential of that distinguished character."

The legislature of Pennsylvania gave him a vote of thanks and a fine gold-hilted sword. On a later occasion the city of Washington presented him with a sword, and the legislatures of Georgia and of Kentucky passed eulogistic resolutions.

Though the war was now practically over, there was no rest for Barney. The navy, that "jealous mistress," still sirened him from his wife and family. In command of the only naval vessel left in commission, he made an important trip to the West Indies, and another with despatches to Paris—returning, after a

[1] Vol. I, pp. 133-134.

hard 50-day's trip with the first news of peace. Both trips were full of danger and adventure. Then (strange as it may seem) he spent three months at home—before another winter's run, a record-breaking passage of 14 days to Havre, on which he carried that distinguished passenger, John Paul Jones.

In 1784 the Navy "closed out." Barney's ship, the *General Washington* (nee *General Monk*), was sold, and our grizzled veteran laid aside his sword. He was not quite twenty-five years of age!

Having received the thanks of a grateful country, he now had to earn a living. After several years of apparent groping, he accepted a civil position in Maryland, and soon afterwards the billet of "Vendue Master" for Baltimore. Though this latter was lucrative, Barney pined between walls: the Call of the Sea was too strong, and in 1790 he was again afloat on commercial ventures.

These merchant cruises were as exciting as any before. The tranquil life was never Barney's. He won heavily, lost heavily, fought, lost his ship, recaptured it, was tried in Jamaica for piracy, was honorably acquitted, was robbed in Bordeaux—and emerged with a tidy little fortune!

We next find him in the service of the French Republic, where he was appointed "Chief of Division" in the French Navy. He had numerous adventures, fought off Britishers—and made a short visit to his family in Baltimore.

In 1798 he resigned his French Commission. Years afterward he received pay for his services (some $60,000), and at about the same time was awarded $45,000 by the Jamaica Admiralty Court for the seizure of a vessel. It is interesting to note that he then established his three sons in business with a capital of $55,000. Barney evidently had, with very different qualities, a good American aptitude for turning honest dollars. Was this the fruit of that wise year in the counting house before he went to sea? He was also a force in politics, and just missed an election to Congress.

In 1812 he was still keen and active, and in less than three weeks after war was proclaimed was in command of a privateer schooner —which had a short but exciting cruise noteworthy for fighting and for prizes. The sale of these and the settlement of accounts occupied him for almost a year. He was then made commodore of a flotilla to command Chesapeake Bay.

This, his last military service, ended very honorably at the Battle of Bladensburg (the "Bladensburg Races,"), when the British captured Washington (in August, 1814). Barney's tars seem to have done the only real fighting on the American side and were highly praised for their efforts. Barney, who had been singularly immune before this, was wounded in the thigh.

The bullet was never extracted. He was sent, as a mark of honor, to carry important despatches to Europe at the close of the war—and returned in a state of collapse. "Old Sir Richard caught at last" was beginning to weaken. In October, 1818, having wound up his affairs in Maryland, he began a long trip to a new home in Kentucky—but was seized on the way by fever accompanied by spasms in his wounded thigh, and "with a bold face," on the first day of winter, he passed to the Great Beyond.

All in all, Barney's life seems to have been a very happy one. Following the Battle of Bladensburg, in which he had rank enough to attract notice, he was a popular idol. To compare his career with that of his brilliant contemporary, Paul Jones, is to muse on luck in life. Both got (and gave) hard knocks a plenty: but with Jones, as many another genius, there was an undercurrent of bad luck. He was always achieving and always just missing the fruits of success. He captured the Serapis and was displaced by the miserable Landais; won a victory for the Russians and paeans —for a ne'er-do-well prince. Perhaps that he was an alien, essentially alone in the world—perhaps that he commanded fear or admiration rather than affection—he was the constant victim of injustice, now overslaughed in rank by smaller men, now losing a promised command or deprived of credit for a victory. Barney's life, on the other hand, was a crescendo of fame and happiness. In youth, the joys of adventure and fighting, not without young love; in age, wealth, position, honor. He was a commanding figure, a genial presence. Paul Jones' life was a flash, and darkness—ending among strangers, in a strange land. Barney died, loved and tended, among his own people.

NOTE.—*Snow*; a vessel formerly much in use. It differs slightly from a brig. It has two masts similar to the main and foremasts of a ship, and close abaft the mainmast a trysail mast. *Snows* differ only from brigs in that the boom mainsail is hooped to the mainmast in the brig, and traverses on the trysail-mast in the snow.—*Sailor's Word Book*, Smythe, 1867.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

HOW TO SHOOT THE SERVICE PISTOL

By LIEUTENANT G. E. BRANDT, U. S. Navy

1. The automatic pistol, when introduced, brought with it a new set of complications to be mastered in order to secure accurate shooting. True, the general principles for securing accuracy with the revolver are equally applicable to the pistol; the difference is in details. When the pistol replaced the revolver, experts were unanimous in the opinion that accuracy had been sacrificed for those other advantages which the pistol was supposed to embody.

2. It is foreign to our purpose to enter into an extended discourse upon the relative merits of the two arms. Such comparative study is interesting but immaterial to the present situation. The tools are not of our choosing. They are given us to do with them what we can.

3. It is not uncommon to hear the remark that good shots, like artists and poets, are born, not made. Add to this the general belief that the pistol as an accurate weapon is inferior even to the revolver, and we have the condition upon which many are prone to excuse want of skill, which in reality is due to a lack of conscientious practice or to a failure to grasp a few simple, but essential, details. Properly directed, in most cases, a little practice will secure evident progress and stimulate interest passing to fascination, and a desire to excel. Many beginners make the same mistakes over and over again, unable to correct errors because they fail to appreciate the causes leading to error. It is the object of this article to point out a few details which if adopted at once might spare the novice a great deal of discouraging shooting in discovering them for himself.

4. Remember that the pistol is a dangerous weapon and that an accidental discharge is never excusable. *Most accidents occur from pistols that are supposedly not loaded.*

5. Before handling the pistol it should be examined to make sure that it is not loaded. Black the front and rear sights. This will make them more easily visible.

6. In aiming the front sight should be seen in the middle of the rear notch and the top of the front sight flush with the top of the notch. Some shots prefer to use a finer or a fuller sight than this, a detail which is of no consequence provided that exactly the same sight is taken for every shot. Other things being the same, a variation in the amount of front sight will cause considerable dispersion. The top of the front sight flush with the top of the notch is recommended because it is believed that this is the

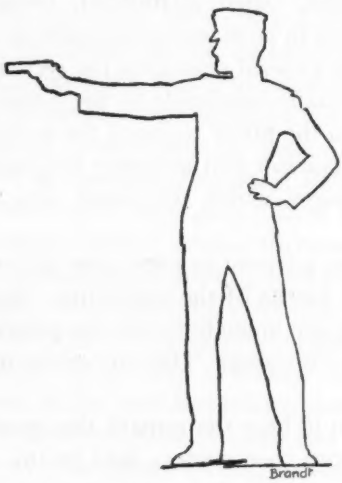


Fig. 1

position less liable to variation which might exist even unconscious to the eye. Vision is not at all times the same. It varies with change of light, with the amount of moisture in the eye and with the condition of the stomach. It might vary in two consecutive shots. The use of amber-colored glasses (known as shooting glasses) are of value in clarifying the vision and giving it additional uniformity. The point on the target at which to aim is determined by practice and varies with the individual and the pistol.

7. Do not cant the piece.

8. *Position of the Body.*—Fig. 1, stand facing nearly at right angles to the line of fire. Plant the feet firmly on the ground, the left heel about three inches to the left and 12 to 18 inches

to the rear of the right heel. Legs straight, not bent at the knees, but not unnaturally stiff. Abdominal muscles relaxed and the abdomen slightly forward. This projects the center of gravity of the body on the line joining the centers of the feet. The weight of the body then should be felt equally distributed about all parts of both feet without a disproportional amount on balls or on heels. The ground should be smooth and permit of firmly placing the feet. Irregularities of ground at the point of contact will produce unequal distribution of the weight of the body with consequent unsteadiness. Brace the body with the left hand grasping the left hip.

9. *The right arm* should be fully extended because it has been found that in this position it is most steady and the wrist is in

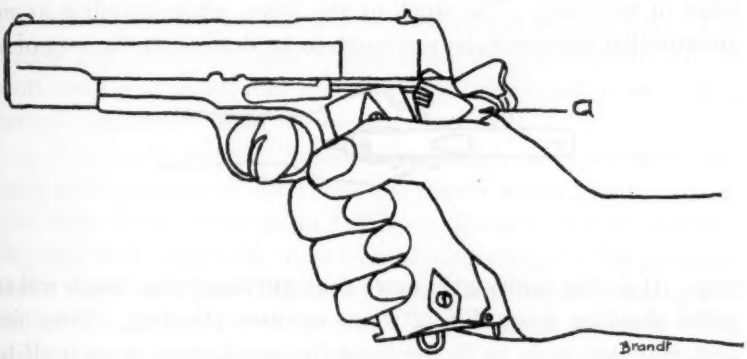


Fig. 2

the natural position. If the elbow be bent there results a strain of certain muscles of the arm to keep it so and the wrist must be bent into a strained and unnatural position in order to level the piece. Further, when the elbow is bent and a pressure exerted with the hand to pull the trigger, the muscles of the hand exert an influence upon those of the arm causing a variation of the bend in the elbow. The full arm extension is, therefore, steadiest and most natural.

The beginner will find some difficulty in holding his arm steady when extended. A little practice will overcome this difficulty and in a short time the requisite steadiness will be developed.

10. *The method of holding the piece* is of great importance. Fig. 2 shows the proper position. Grasp the piece firmly, hand high on the stock, forced well up against the part *a*. The thumb

should be turned in a little so that its inner surface fits firmly against the stock. The thumb is bent at the first joint to conform to the curved surface of the stock, the end resting on the magazine latch.

11. The line of the barrel should be as nearly as possible a continuation of the extended arm, Fig. 3. The recoil will then be taken up by the whole arm and there will be no tendency to jump to the right or left when the piece is discharged.

12. The base of the first joint of the trigger finger is placed against the trigger. It will be advocated by some that the second joint should be held against the trigger. This would be true if it were not for the fact that in order to so place the second joint it is necessary to completely alter the grip with consequent sacrifice of accuracy. The stock of the piece, while excellent as an ammunition container, leaves much to be desired in the way of a

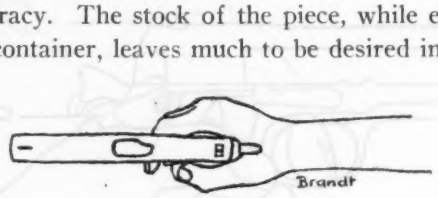


Fig. 3

grip. It is this faulty grip more than anything else which makes pistol shooting more difficult than revolver shooting. Since the grip was not made to fit the hand the hand must adapt itself to the grip. If the second joint is placed on the trigger it is impossible to align the piece as indicated in Par. 11, unless the fingers are unusually long.

13. The middle, ring and little fingers are curved around and grip the stock as high as possible. The middle finger should press up against the trigger guard and each finger should press tightly upward against the one next to it. This pressure is necessary in order to keep the muzzle from dropping when the piece is discharged. Relaxing this upward pressure causes low shots. Further if the fingers come too low on the stock the act of squeezing the hand to discharge the piece causes the heel of the stock to go to the rear and the muzzle to drop. The heel should be firmly seated against the hand as shown in Fig. 2.

14. *To fire* align the sights at the point of aim, gradually tighten the grip, increasing the pressure with the whole hand uniformly. There should be no independent movement of the trigger finger. The piece should be discharged by a tightening of the whole hand. It will be found difficult to keep "on," so there must be absolute control of the hand pressure to insure discharge at the proper instant. Continued practice is necessary to secure intimate coordination of the muscles that the fire may be held or released at will without the tendency to snap. The tightening of the grip also tightens the muscles of the arm, and gives the arm steadiness. When the piece is first aligned on the target and before the pressure is applied to the hand, the arm will be a little unsteady. As the pressure is applied steadiness is obtained. For this reason it is undesirable to have a light trigger pull. The trigger pull when the gun comes from the manufacturer is in most cases just right, and if it is free of drag and permits of a smooth release, it should not be tampered with.

15. Having by practice found the correct point at which to aim, study your targets and determine the causes which lead to misses. *Low shots* result from failure to press upward with the middle, ring and little fingers or from lack of uniformity in the pressure of the hand—too great a grip with the lower fingers causing the heel of the piece to go to the rear and the muzzle to drop. The whole piece should be firmly gripped, but the pressure should be uniform. Accuracy is impossible if the piece is held loosely.

16. *High shots* result from insufficient pressure with the lower fingers or from a slight upward movement of the arm just as the piece is fired.

17. *Right or left shots* are caused by failure to adjust the hand properly to the stock or failure to align the piece properly with the hand.

18. *Wild shots* in any direction will result from lack of steadiness, improper sighting, flinching or closing the eye.

19. The right eye should be kept open.

20. The remarks repeatedly published for the revolver regarding flinching, practice, effect of wind, drill and training, precautions, care of the piece, apply with equal force to the pistol.

21. It is a good plan to cut away part of the wood stock on each side as shown in the shaded portion of Fig. 4. This will permit a more intimate contact with the thumb and the base of the first finger and secure a better grip.

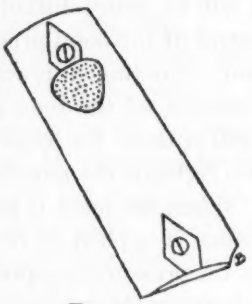


Fig. 4

22. *To refill magazine* hold the magizine in the left hand as shown in Fig. 5. Place the thumb over the top so that the end

Fig. 5

of the thumb is just touching the little raised bump in the magazine follower. Take seven cartridges in the right hand. Insert them into the magazine one at a time by placing the base of the

cartridge against the end of the left thumb and pressing downward and inward. The cartridges will slide easily into place.

23. Practice with the pistol should not be limited to actual firing. Aiming drill with the piece unloaded is excellent practice and so nearly simulates actual firing that it is claimed by some that one can become a good pistol shot without firing a shot. Aiming drill should be conscientiously carried out, care being taken to observe all the details necessary to insure accuracy. Careless habits are easily formed and not easily broken. Constant vigilance is necessary. Take plenty of time for each shot. Do not attempt to fire rapidly until the principles are fairly mastered. The dotter supplied to ships is very useful. It is a good plan to save targets from time to time for comparison to denote the degree of progress being made.

24. It is believed that with attention to the details here laid down accuracy may be obtained only a little short of that obtainable with the .38 caliber service revolver.

25. *Recapitulation.*

(a) Keep the hand as high as possible.
(b) Press upward with the fingers.
(c) Middle finger pressed against guard.
(d) Seat the heel.
(e) Squeeze with the whole hand—***don't pull.***
(f) Align the piece with the arm.
(g) Extend the arm.
(h) Hold the piece firmly.
(i) Don't cant.
(j) Center the front sight.
(k) Take the same sight always.
(l) Attain accuracy before attempting rapidity.
(m) Practice often without loading.

DISCUSSION

"Brood of the Constitution"

(See Page 925, Whole No. 163)

James Morris Morgan.—That is a good criticism which Mr. Park Benjamin writes on the story of the "Brood of the *Constitution*," but it has one small defect: he has mistaken the "Brood."

Before pointing out the errors in his criticism published in the May-June number of the United States Naval Institute Proceedings, I wish to disclaim being the originator of the title "Brood of the *Constitution*" as applied to the class of 1860. I first heard the name some 30 years ago, when several naval officers were discussing the Samoan episode, where Commander Leary (a member of the class of 1860), while in command of the little wooden sloop-of-war *Adams*, cleared his ship for action and bluffed the captain of a modern cruiser out of his amiable intention to shell a native village in which there were women and children. One of the naval officers in the company, chuckling over the outcome of the affair, remarked "that the German captain must have received the jolt of his life when he ran afoul of one of the 'Brood of the *Constitution*.'" Having made this explanation as to how I obtained the title for my story, I will proceed to point out some of the inaccuracies contained in Mr. Benjamin's article.

First. He says the *Constitution* came to Annapolis in 1859. Now, according to the U. S. Naval Registers of 1859-60, the *Constitution* was at that time "in ordinary" at the Kittery Navy Yard, Portsmouth, and the entries in the log book of the *Constitution* show that she sailed from Portsmouth harbor under the command of Lieutenant (Admiral) David D. Porter, on August 5, 1860, and arrived off Annapolis on August 18, and was moored off the Naval Academy on the morning of August 22, 1860.

Second. Mr. Benjamin asserts that "it (the class of 1860) was not the first class to live on board, for that was the entering class of 1859." Now, how could the class of 1859 have lived on board of her when she was not at Annapolis at that time?

Third. He says: "The class of 1860, it is true, began its career on the old vessel, but was removed when it became necessary to refit her to defend the station against a threatened Confederate attack. After General Butler arrived with his troops, she was hauled out into the bay. . . . ." I am authorized by Rear Admiral Charles E. Clark (retired), who is a member of the class of 1860, and who was on board of the *Constitution* at that time, to say "that when the *Maryland* arrived at Annapolis with the 8th Massachusetts Regiment on board, she went alongside of the *Constitution* and then steamed out into the bay, with all the troops on

board, as Governor Hicks, a Union man, feared that the State of Maryland might attempt to secede if they were landed, as the 6th Massachusetts Regiment had already been attacked as it marched through the streets of Baltimore, and that it was only a portion of the class of 1860 that was put on shore from the *Constitution* to reinforce the midshipman battalion and assist in defending the Academy from a threatened attack by the mob, and that the cadet officers and many others of the class were kept on board the ship, and that those who went on shore were only out of the vessel for four days, and furthermore that the class of 1860 was the only one of the classes who were trained on that historic ship which ever had the honor of going to sea in her.

Rear Admiral Clark further makes the statement that "the class of 1860, while at Newport, instead of living on shore and occasionally drilling on the *Constitution*," as stated by Mr. Benjamin, "lived on the ship and occasionally drilled at Fort Adams, and instead of having been only a part of the year on the *Constitution* they went on board of her in September, 1860, and left her in September, 1861, when they were removed to the Atlantic House, the temporary Naval Academy at Newport." I ask then, how is it possible that the class of 1862 could have been the first class of midshipmen to have remained on board of the famous old ship for an entire year?

In my story of "The Brood of the *Constitution*" published in the January-February number of the UNITED STATES NAVAL INSTITUTE PROCEEDINGS I can assure Mr. Benjamin that I had no intention of detracting from the fame or merit of any of the other classes who passed their first year at the Naval Academy on board of the glorious old ship, nor did I mean to claim that the class of 1860 was the only "Brood of the *Constitution*," but only intended to remind the younger generations of naval officers that owing, in a great measure, to the fortunes of war, it was "par excellence" "The Brood of the *Constitution*," and in support of this claim I gave a synopsis of the war records and distinguished services of as many of the class as I could obtain at this late day. Mr. Benjamin, ignoring my account of the large number of the 1860 date who covered themselves with glory at the battles of Mobile Bay and Fort Fisher in the Civil War, and at Manila and Santiago during the Spanish War, comes back at me with the claim that, while his class was on board of the *Constitution*, they gazed with the deepest awe upon "Charley" Stewart, Goldsborough, Paulding, and Farragut. (Why not Dave?)

P. S.—I met Rear Admiral John H. Upshur (retired) to-day (June 13) and discussed with him Mr. Benjamin's article. Admiral Upshur said: "You tell Park Benjamin that I say he is a wee bit mistaken in his data. I was the executive officer of the *Constitution* in 1860 at Annapolis and in 1861 at Newport, and Clark and yourself are perfectly accurate as to the facts stated in your answer to his criticism."

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Annual Dues

The annual dues for 1916 became payable on January 1, 1916. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practised by a number of members, both regular and associate. Response to this notice will save the Institute a considerable sum in stationery and postage. Beginning January 1, 1916, members residing abroad permanently or for any length of time will be charged postage at the rate of fifty cents a year.

Special Notice

It is believed that the scope of usefulness of the PROCEEDINGS to members of the Institute can be increased and all members are invited to assist in this work. Should any topic occur to you on which you think an article could well be written, or on which you would like to read one, send such topic to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that anyone who can spin such a yarn will submit it.

Suggested Topic

The accompanying extract from a letter received from Mr. H. C. Palmer, of Buffalo, associate member, is published in the hope of inspiring an article similar to the one requested:

I wish to suggest that it would be very enlightening if the Institute would publish an essay on the subject of blockade and contraband. I am fairly familiar with naval literature but I am entirely unable to find anything that fully describes the position of the United States during the Civil War in regard to shipments through Matamoras. I cannot find whether or not the United States was able to prevent shipments of contraband through that port. Professor Soley, in his book "Blockade and the Cruisers," touches on this point but does not explain the situation fully.

I suggest that this essay might explain in detail the cases of the *Peterhof*, the *Labaun*, the *Springbok* and the *Will-o'-the-Wisp*. In the case of the latter, the capture of which is described on page 525, of volume 18, "Official Records of the Union and Confederate Navies," the British naval officers, at least, took a very different position from that which the British government takes now. As precedents of the Civil War are being cited, a complete statement of those precedents is badly needed.

I suppose, of course, naval officers are entirely familiar with the subject, but civilians are not, and so far as I can find, no one knows where to find a general statement of the American position in the Civil War.

References

Attention is invited to the following articles which have appeared in the pages of the PROCEEDINGS during the past two years; they treat of subjects which closely concern Naval War College work; a perusal of them should prove profitable:

1914

War and Policy. By Captain J. S. McKean, U. S. N.; page 1, Whole No. 149, June, 1914.

Moral Training in Preparation for War. By Charles M. Bakewell; page 157, Whole No. 149, January, 1914.

The Great Lesson from Nelson for To-day. By Lieut. Commander D. W. Knox, U. S. N., P. E., page 295, Whole No. 150.

Naval Policy as it Relates to the Shore Establishment and the Maintenance of the Fleet. By Captain John Hood, U. S. N., H. M., 1914; page 319, Whole No. 150, March, 1914.

Details of Navy Department Administration: Navy Department Policies. By Lieut. Commander N. L. Jones, U. S. N.; page 377, Whole No. 150, March, 1914.

Military Preparedness. By Naval Constructor Richard Gatewood, U. S. N., H. M., 1914; page 631, Whole No. 151, May, 1914.

What Should be the Relations Between Battle and Reserve Fleets. By Captain W. S. Sims, U. S. N.; page 727, Whole No. 151, May, 1914.

Old Principles and Modern Applications. By Dudley W. Knox, U. S. N., H. M., 1914; page 1009, Whole No. 152, July, 1914.

The Battle of the Sea of Japan: Translation Japanese General Staff Report. By Captain W. T. Hoadley, U. S. Marine Corps; page 961, Whole No. 152, July, 1914.

Some Foreign and Other Views of War and the Study and Conduct of War. By Captain Albert Gleaves, U. S. N.; page 1301, Whole No. 153, September, 1914.

Strategic Problems and Their Solution. By Captain R. von Labres, I. G. N. Translated by Surgeon J. F. Leys, U. S. N.; page 1409, Whole No. 153, September, 1914.

1915

Employment of Torpedo Vessels in Night Search. Translation. By Lieut. Commander W. N. Jeffers, U. S. N.; page 89, Whole No. 155, February, 1915.

Extracts from Mahan's Naval Strategy. By Lieutenant W. T. Lightle, U. S. N.; page 155, Whole No. 155, February, 1915.

The Rôle of Doctrine in Naval Warfare. Prize Essay. By Commander Dudley W. Knox, U. S. N.; page 325, Whole No. 156, April, 1915.

Naval War College Principles and Methods Applied Afloat. By Captain W. S. Sims, U. S. N.; page 383, Whole No. 156, April, 1915.

The Work Ahead of Naval Aviation. Lieutenant R. C. Saufley, U. S. N.; page 505, Whole No. 156, April, 1915.

An Air Fleet, Our Pressing Naval Want. By Commander T. D. Parker, U. S. N.; page 709, Whole No. 157, June, 1915.

The Estimate of the Situation. By Rear Admiral Austin M. Knight, U. S. N.; page 765, Whole No. 157, June, 1915.

The Control of Fleets in Action. By Lieutenant H. H. Frost, U. S. N.; page 1053, Whole No. 158, August, 1915.

Naval Scouts. By Commander Ralph Earle, U. S. N.; page 1099, Whole No. 158, August, 1915.

Peace or War? By Commander A. W. Hinds, U. S. N.; page 1409, Whole No. 159, October, 1915.

Battle Tactics. By Lieutenant R. A. Dawes, U. S. N.; page 1873, Whole No. 160, December, 1915.

Bureau of Information

The Institute offers its services as a "Bureau of Information" on professional questions and will endeavor to obtain replies from the best qualified sources. Those "Questions and Answers" which are suitable for purposes of general information, will appear in the PROCEEDINGS. It is suggested that knotty questions which come up in professional examinations for promotion may well be submitted to this department.

Membership

Since May 17, 1916, 15 regular and 29 associate members have joined the Institute. The following members have died:

Captain P. F. Werlich, U. S. Navy.
Lieutenant C. A. Richards, U. S. Navy.
Captain Thomas Nelson, U. S. Navy.
Lieut. Commander R. S. Douglas, U. S. Navy.
Lieutenant R. C. Saufley, U. S. Navy.
Commodore J. H. Sears, U. S. Navy.

New Memberships

It is gratifying to record the growth of the associate membership list. Much of the credit for this increase must be given to Mr. Thomas G. Frothingham, associate member, of Boston. The Secretary quotes with pleasure extracts from a letter recently received from Mr. Frothingham: "I am much interested in your society and I believe that membership is the best way of showing a real interest in the navy. . . . . Your Institute has its character so well defined that it is safe from all political and limelight influences, and I honestly believe it should be *the society*, representative of the navy throughout the country." It is hoped this quotation will suggest to both regular and associate members a further means of extending the usefulness and scope of the Institute.

Changes in Officials

The changes in "Officers of the Institute" noted in this number of the PROCEEDINGS were impelled by the detachment from the Naval Academy of Commander J. R. P. Pringle, U. S. Navy, member, and of Lieut. Commander B. C. Allen, U. S. Navy, secretary and treasurer, under orders to sea duty. The Board of Control elected Lieut. Commanders J. Halligan and J. W. Greenslade, U. S. Navy, respectively to fill the vacancies so caused.

Notice

Whole Nos. 145, 146, 147, 149 and 155 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, and January-February, 1915) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

Address of Members

Members, especially those on the retired list, and civilians are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS are to be sent, and thus insure their receipt.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers. Bills will be rendered upon delivery of books.

Error in Book Advertisement

In Whole No. 163 of the PROCEEDINGS (May-June, 1916) Ship and Gun Drills, 1916, is advertised as ready about July 1, 1916. Ship and Gun Drills, 1916, is a reprint of Ship and Gun Drills, 1914, without changes and the advertisement should have so stated.

Non-receipt of Proceedings

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of the even numbered month.

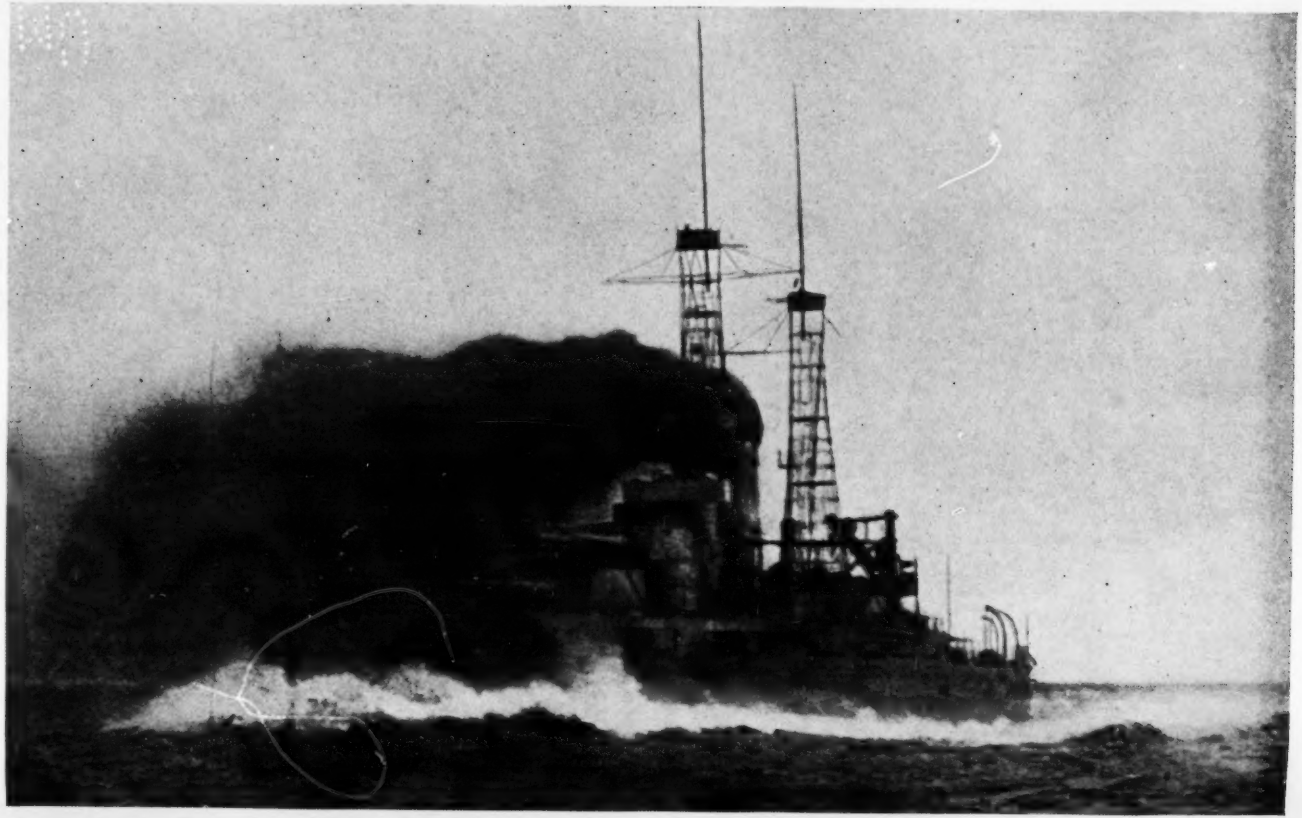
Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted.

Notice to Newsdealers

The discount to newsdealers is now 10 per cent, instead of the 25 per cent heretofore allowed on subscriptions.

ANNAPOLIS, MD., July 17, 1916.



THE "NEVADA," MAKING 21.04 KNOTS ON HER OFFICIAL TRIALS

PROFESSIONAL NOTES

Prepared by LIEUT. COMMANDER J. W. GREENSLADE, U. S. Navy

GENERAL ARRANGEMENT

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NAVAL POWERS

ARGENTINA

DAMAGE TO "RIVADAVIA."—We have been informed on unimpeachable authority that the Argentine battleship *Rivadavia* has suffered such extensive damage through stranding in the harbor of Bahia Blanca that she will go back to the yards of her builders, the Fore River Shipbuilding Corp., Quincy, Mass., for repairs amounting to a practical rebuilding of the turret machinery and foundations. This ship was finally accepted a few months ago by the Argentine Government. Owing to the collapse of the floor of the graving dock which was being built in the military port at Bahia Blanca for

the docking of the *Rivadavia* and *Moreno*, there is not at present in Argentina a dock capable of receiving these ships and they will have to come to this country for any repairs necessitating long sojourn in dock.—*Shipping Illustrated*, 7/6.

REVIEW OF WARSHIPS.—A review of warships of Argentine, Brazil, and Uruguay in the roadstead of the Plata River marked the celebration of the centenary of the independence of Argentina on July 8. President de la Plaza, accompanied by Frederic J. Stimson, the American Ambassador, and the other diplomatic representatives, review the vessels from the cruiser *Buenos Aires*. The Argentine dreadnoughts *Rivadavia* and *Moreno* led the double column of warships.—*New York Times*, 9/7.

AUSTRIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Ersatz Mon'ch	24,500	22½	10 14-in.	Trieste	Laid down, 1914
" Budapest	24,500	22½	same	"	" " 1914
" Wien....	24,500	22½	same	Fiume	" " 1914
" Hapsburg	24,500	22½	same	Trieste	" " 1915

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

1 Battleship					
Szent Istvan..	20,010	20	12 12-inch	....	Completed in 1914
5 Light Cr'sers					
Saida class....	3,454	27	9 4.1-in., 2 6-pdrs.	....	Completed in 1914-15

Note.—Approximately 24 torpedo boats and six submarines were building in July, 1914. Official information regarding naval matters being unobtainable since the outbreak of war, it may be assumed that ship yards have been kept busy to their utmost capacity, and that new vessels have been laid down as fast as those building have been completed.

FRANCE

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Languedoc....	24,828	21.5	12 13.4-in., 24 5.5-in.	La Seyne	Laid down April 28, 1913
Normandie....	24,828	21.5	same	St. Nazaire	" July 5, 1913
Flandres.....	24,828	21.5	same	Brest	" Oct. 10, 1913
Gascogne.....	24,828	21.5	same	Lorient	" Oct. 1, 1913
Bearn	24,828	21.5	same	La Seyne	Contract Jan. 7, 1914

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

3 Battleships					
Bretagne class.	23,172	20	10 13.4-inch	....	Completed in 1915

NOTE.—There are approximately six destroyers and 23 submarines under construction. (Lack of information since outbreak of war has made it impossible to correct table to date.)

In July, 1914, France had building approximately 3 destroyers and 22 submarines.

Since the outbreak of war it is probable that France has increased her construction program to the extent permitted by the building facilities.

TORPEDO PROTECTION FOR BATTLESHIPS.—Special interest attaches to the recommissioning, for further service in the Levant, of the 9000-ton coast-guard battleship *Henri IV* by Captain de Boissoudy, a distinguished officer who has had the benefit of an extensive experience in charge of flotillas, as is the case with most of the officers recently appointed in command of battle units. The *Henri IV* appears to be the French armored ship that has rendered the most valuable services in the Levant. She has been repeatedly commended in dispatches for her success in accomplishing perilous missions and in withstanding the effect of both gunfire and submarine explosions, and, in turn, Constructors Bertin and Ferrand and Mons. Olivier Guilteneuc have described her as being up to the present the best protected ship in the French service and the best adapted to the actual conditions of warfare. Invaluable data as to the anti-submarine defence—data naturally jealously guarded—are believed to have been gained from her eventful experience of the war, any many see in her the prototype of the "unsinkable" battleship of the future. She is in design and appearance unlike anything afloat, and her peculiar silhouette has often been a subject of wonder and amusement for British seamen.—*Naval and Military Record*, 24/5.

In what concerns vulnerability to submarine explosions, it is remarked that the *Normandie* is very much better off than the *Jean Bart*, which survived a hit by an Austrian torpedo of the latest type. Elastic armored longitudinal bulkheads, robust transversal bulkheads, and an improved distribution of the coal bunkers, together with the placing of shellrooms at a good distance from the hull, and up-to-date devices to maintain or restore the stability, must be said to place the most recent additions to our battle fleet in a favorable position to successfully withstand the shock of torpedo or mine, though it is generally felt the submarine menace was not given quite sufficient attention on the part of the designers; but this is, of course, a sort of reproach to which are open all the contemporaries of the *Normandie*.—*Naval and Military Record*, 7/6.

NEW DESTROYER.—The *Enseigne-Gabolde*, the latest addition to the French flotillas, perpetuates in the service the memory of a devoted young officer who lost his life in a brave attempt at rescuing the victims of the ill-fated *Liberté* (1911). She is the last of her series, and also the largest. Although not comparing well with her British contemporaries of the *M—N* classes, that are of greater size and better armed, she is superior to all hostile destroyers, which is the main point. She has a displacement of 906 tons 200 tons more than the *Bouclier* prototype of French seagoing contre-torpilleurs, and has been designed with a view to robustness and endurance at sea.—*Naval and Military Record*, 7/6.

RECONSTRUCTION OF OLD VESSELS.—With commendable perseverance the Rue Royale Admiralty has refitted and successively commissioned for sea the whole of her obsolete protected cruisers of the *Du Chayla-Descartes-Lavoisier-D'Estrées-Cosmao* series (2000 to 4000 tons, 18-20 knots), constructed from 1888 to 1899, that were at all found to be in a seaworthy condition. These neglected veterans, which it had long been the fashion to disparage as being "able neither to fight nor to run," have rendered excellent services in the Atlantic and Mediterranean, and the only regret is that there are not more of them. In addition to fast scouts for blockading duties with the battle fleet, the war has shown the need of numerous cruisers and gunboats for coastal or patrolling work, and naval men here are warm in their approval of the English lead in reviving the coastal monitor and gunboat of old, economical in construction and upkeep, of shallow draught and relatively invulnerable, and consequently invaluable for the defence of bases and coasts as well as for service in mine-infested areas. Small size and diminutive target together with number are the chief factors being insisted upon, and the reduction of the displacement of our new *éclaireurs* from 6000 to 4500 tons, at one time so sharply criticised, is now being generally approved.—*Naval and Military Record*, 14/6.

GERMANY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Ersatz Worth.	29,000	....	8 15-in., 16 5.9-in.	Kiel	Laid down Sept., 1913
"T" 1913.....	29,000	....	same	"	" May, 1913
Ersatz Friedrich III	30,000	....	8 15-in., 18 5.9-in.	....	" summer 1914
Cruisers of the Line					
Ersatz Hertha.	28,000	28.5	8 12-in.	Wilhelmshaven	Laid down July, 1913
Ersatz Victoria Louise	.....	....	....	....	" summer 1914

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

4 Battleships					
Grosser Kurfürst class	25,388	22	10 12-inch	....	Completed in 1914-15
2 Battle Cr's'rs					
Derfflinger class	28,000	27	8 12-inch	....	" " "
5 Light Cr'sers					
Ersatz Hela class	5,500	27.5	10 6-inch	....	" " "

NOTE.—In July, 1914, Germany had building approximately 24 destroyers and 18 submarines.

No accurate information regarding naval matters has been obtained since the outbreak of the war, but it is reported that ship construction has been pushed to the full extent of building facilities.

ESTIMATED STRENGTH OF GERMAN NAVY.—It is interesting to estimate the probable composition of the German fleet at this moment. In August, 1914, they had in commission or ready for commission 21 dreadnoughts, including their battle cruisers; 20 pre-dreadnoughts, excluding the small *Hagens;* 9 armored cruisers, including the *Blücher;* 45 light cruisers, including the *Karlsruhe* and *Rostock;* 132 destroyers, down to and including the 1912 program of boats; 80 torpedo-boats; and an unknown number of submarines, not exceeding 30. At that time they had in hand a number of vessels, all of which are now probably completed. These were 8 dreadnoughts, including the Greek *Salamis;* 8 light cruisers, including two building for Russia; 38 destroyers, including 14 building for foreign governments; and an unknown number of submarines, to which many have since been added. Then we come to their losses. Two dreadnoughts have gone, the *Goeben* and *Von der Tann;* 1 pre-dreadnought, believed to have been the *Pommern;* 6 armored cruisers; 15 light cruisers; about 20 destroyers; at least 6 torpedo-boats; and a number of submarines, which have been estimated by some neutrals to be in the neighborhood of a hundred. With additions and subtractions, the net totals of Germany's naval strength stand at present, according to these figures, as follows: 27 dreadnoughts, 19 pre-dreadnoughts, 3 cruisers, 38 light cruisers, 150 destroyers, 74 torpedo-boats, and a very problematical number of submarines.—*Naval and Military Record,* 20/5.

GERMAN WARSHIP DESIGN.—From information lately to hand it seems fairly certain that the war reinforcements of the German fleet include a

number of monitors, and some superannuated warships which have been rendered impervious to underwater explosion.

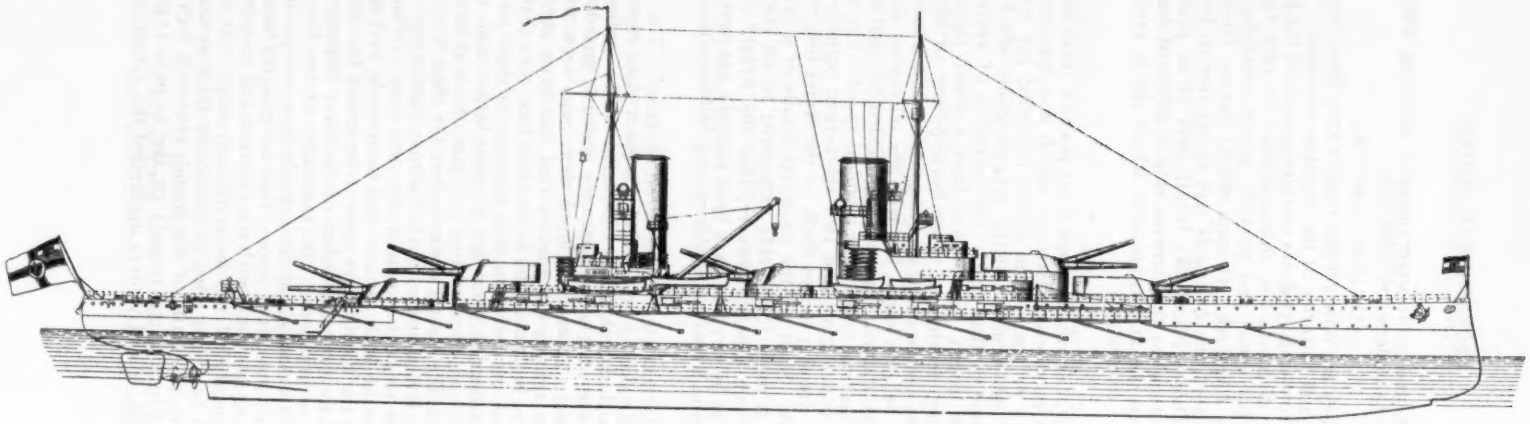
* * * *

It is understood they are now getting ready to try their monitors against the mobile defences and batteries of the Russian seaboard. They are also employing their old converted cruisers on convoy work in the Baltic. (Continuing, this article discusses the characteristics of new German dreadnoughts.) Except for speed and possibly armor protection they closely resemble the *Queen Elizabeth.* If semi-official figures from an Austrian source are to be trusted, the *Ersatz Worth* is 623 feet in length, which is almost exactly the *Queen Elizabeth's* length over all as given in the 1914 "Taschenbuch." But unless the German ship is designed for a speed considerably higher than the 21.5 knots with which she is credited, 623 feet strikes one as rather excessive.

* * * *

The only other surprise which seems at all possible from the enemy's side is the Diesel-driven commerce-destroyer, which was supposed to be under construction in 1913 or 1914. One report identified her with the *Ersatz Gazelle,* one of the light cruisers of the 1914 program, which was begun at Bremen early in June of that year. This vessel is of approximately 5000 tons and 475 feet in length. She was to have a mixed installation of turbines and oil engines, developing 31,000 horse-power, of which the Diesel engine, operating the center shaft, was to contribute 6000 units. The maximum speed was to be 27½ knots, but with the oil engine alone a speed of 16 knots could be maintained. Space was provided for coal and oil equal to a radius of 15,000 nautical miles at economical speed. The armament consisted of twelve 4.1-inch guns and two submerged torpedo-tubes. There was vertical armor about 4 inches thick on the water-line, together with a steel protective deck. Such are the unofficial details of a vessel which was expected to prove a most formidable antagonist to an enemy's merchant shipping. It does not appear, however, that the *Ersatz Gazelle* (or the *Wiesbaden,* as she is believed to have been named) has ever been used for this purpose.—HECTOR BYWATER, in *Naval and Military Gazette,* 18/6.

THE GERMAN BATTLESHIP "GROSSER KURFUERST."—The group of four vessels known as the *König* or *Grosser Kurfürst* class represent the latest type of German battleship that was completed on the outbreak of the war. The details of these vessels had been very jealously guarded, but when the principal details were at last disclosed there was seen to be very little foundation for the sensational rumors that had been current. The new ships were found to be heavier by more than 1000 tons than the preceding class, but there was no corresponding increase in their power of offence. Contrary to expectation, they carried no guns larger than 12 inches. This was the more surprising because a 14-inch gun of naval pattern was known to have been built at the Krupp works before the ships were laid down, and positive statements had appeared in the German papers that weapons of this caliber were about to be introduced into the navy. When, therefore, it became known that no such advance had been made, and that, on the contrary, the ships of the *König* class were to be armed like their predecessors with 12-inch guns, the ordnance policy of the Navy Department came in for a certain amount of criticism. The excellence of the Krupp 12-inch gun, with its high initial velocity and remarkable figure of penetration, was not denied, but most of the critics agreed that for general battle purposes this gun did not compare favorably with the 13.5-inch and 14-inch weapons which were carried by nearly all the latest foreign ships. At most ranges the 12-inch gun could be relied upon to pierce the thickest armor likely to be encountered, but its projectile of 860 pounds obviously lacked the smashing power of the 13.5-inch (1250 pound) or the 14-inch (1400 pound) shell. On the other hand, official writers applauded the retention of the 12-inch



THE GERMAN BATTLESHIP "GROSSER KURFÜRST"

—*The Engineer.*

gun on the ground that besides its admirable ballistics it was of singular lightness, the 50-caliber model weighing only 47 tons, as against the 76 to 80 tons of the British 13.5-inch. The saving in weight thus effected could, they maintained, be put to good use by strengthening and extending the armor and internal protection of the ship, and in various other ways. Nevertheless, it was no secret that the majority of German naval officers would have rejoiced to see heavier guns mounted in the new ships, as indeed was shown by the chorus of approval which greeted the news that in future vessels a 15-inch armament would be provided.

The principal details of the *Grosser Kurfürst* and her sisters of the *König* class are set forth in the following table.

	"König" class (4 ships)
Length	574 feet
Beam	97 feet
Draught	27¼ feet
Displacement, tons	25,800
I. H. P.	31,000 (turbine)
Designed speed, knots	20.5
Armor belt	14-in.
Armament	10 12-in. 14 5.9-in. 10 3.4-in.
Torpedo-tubes	5
Coal, normal, tons	1000
maximum, tons	3600

In the *König* class all five turrets are on the center line, the second and fourth being superposed to enable their guns to fire over the fore and aft turrets respectively. By this arrangement all ten guns can be trained on either beam through a fairly wide arc, and four guns bear ahead or astern. This implies some sacrifice of axial fire, to which German tacticians had hitherto attached great importance.

The 14 5.9-inch quick-firing guns are mounted in an armored upper-deck battery, the end ports of which are recessed to permit of end-on fire. These guns are a new model, 50 calibers in length, firing a projectile of 101 lbs., with an initial velocity of 3083 foot-seconds. Of the ten 3.4-inch 21-pounders that represent the tertiary armament, six are mounted behind light armor near the base of the forward super-firing turret, while the remaining four are placed in the superstructure near the after funnel. These four guns appear to be on high-angle mountings, for use against aircraft. The list of guns is completed by two 1½-pounders automatics and ten machine guns of rifle caliber. Five submerged torpedo tubes are fitted, the positions of which are shown on the plan. In this and other recent designs the stern tube, as fitted in the *Nassau* and *Helgoland* classes, has been omitted.

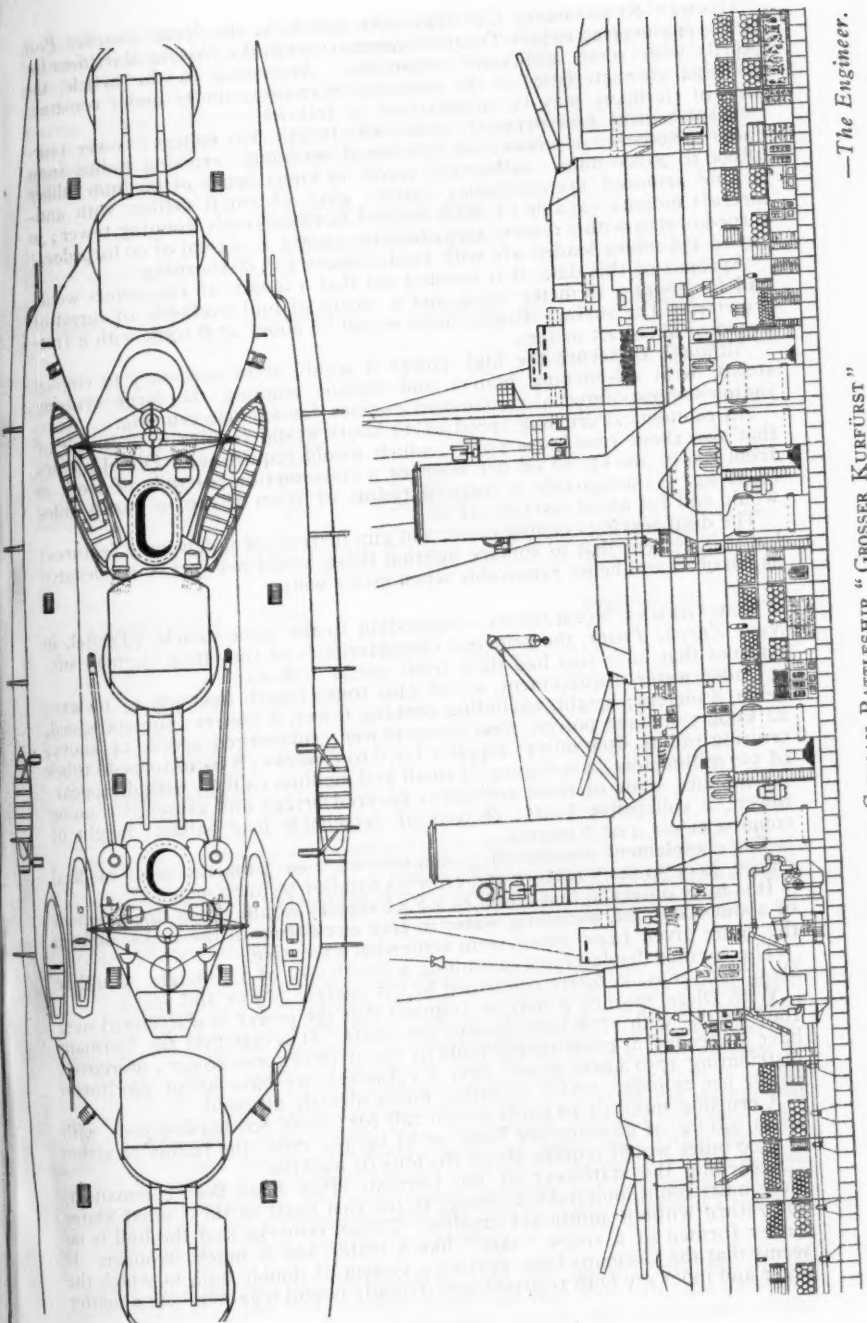
A very elaborate system of protection, against both shell fire and submerged attack, has been introduced into the *Grosser Kurfürst* and her three sister ships, and it is estimated that each ship carries nearly 6500 tons of armor. The main belt, which has a depth of 12 feet, is 14 inches thick on the water-line amidships, tapering to 6 inches at the extremities. At normal draft it extends 6 feet below the surface, and from the lower edge there rises a thick sloping protective deck. Above the main belt there is a strake of 10-inch armor, and above this again the 8-inch plating over the secondary battery, the guns of which are isolated by stout splinter screens. The port plates of the 12-inch turrets are 14 inches thick, the bases, where they are not protected by the side armor, being of the same thickness. The forward conning tower is a large and roomy structure protected by 14-inch armor. There is a special compartment for the fire-control staff, surmounted by a 20 foot base rangefinder in an armored hood. The sighting slots are fitted

with splinter-proof wedges, and the general design of the tower is eminently practical. The after conning tower is considerably smaller, and has 10-inch armor. It has been reported that the funnel bases are armored to a height of 15 feet above the deck, but this feature has not been fully verified. Protection against underwater explosion is afforded by double longitudinal torpedo bulkheads at each side of the ship, together with many unpierced transverse partitions, the end bulkheads having a thickness of 12 inches. On the whole, the impression conveyed by the armor figures of the *Grosser Kurfürst* is that the designers were so engrossed in the problem of giving adequate protection that they had little time to devote to the armament. Certainly there is a striking disproportion between the defensive and offensive powers of this vessel.

At the first ship of the class was completed only a few months before the declaration of war, no particulars of the steaming trials are available. This is the more to be regretted, since the vessels are fitted with a new type of turbine, said to have been designed by the Navy Department's own engineering staff, and known as the "Marine" turbine; and it would, therefore, have been interesting to compare the trial performances with those of the *Kaiser* class, three ships of which have Parsons turbines and the other two—*Friedrich der Grosse* and *König Albert*—A. E. G. and Schichau turbines respectively. The nominal figure for the *Grosser Kurfürst* is 28,000 shaft horse-power, but most probably this was much exceeded. The *Kaiserin*, a vessel of the same nominal horse-power, developed 42,500 shaft horse-power on full-power trial, her mean speed being 22.3 knots, whilst the *Kaiser* worked up to 55,000 shaft horse-power and 23.5 knots. The *Grosser Kurfürst* has 15 boilers of the Schulz-Thornycroft type, which is now practically universal in the German Navy. Certain of these boilers are oil-fired, provision being made for storing 700 tons of liquid fuel in the double bottom.

The Germans claim for their ships a remarkable degree of steadiness, and from all accounts they do enjoy some advantage in this respect, but as views of the *Kaiser* class and of the German battle cruisers taken in dry dock show them to have very wide bilge keels, and they are also known to be equipped with anti-rolling tanks, their reputed steadiness in a seaway may not be entirely due to the form of the hull.

Of the battleships subsequent to the *König* class few trustworthy particulars are known. The first two were laid down under the 1913 program, the *Ersatz Wörth* at Schichau's yard, *Danzig*, and the *T* at the Howaldt yard, Kiel. It was, however, reported in the German press before the war that some delay had occurred in connection with the first-named, the actual laying of the keel plate being delayed until February, 1914. A third ship, *Ersatz Kaiser Friedrich III*, was to be commenced in 1914. How many additional ships have been built under the war program it is, of course, impossible to say. This new class represents a very great advance in fighting power, for the main armament consists of eight 15-inch guns, with a secondary battery of 16 5.9-inch quick-firers, the disposition of the big guns, according to a rough plan in the 1914 *Nauticus*, being on the same system as that of *H. M. S. Queen Elizabeth*. No data relative to the speed or displacement of the class have found their way into the press. Assuming, as it is prudent to do, that the first three vessels of this type have been completed, the German fleet now contains 20 dreadnought battleships in all, of which four are armed with 11-inch guns, 13 with 12-inch, and three with 15-inch guns. In addition, there are—including the *Goeben*—seven, or possibly eight battle cruisers, of which the first four carry 11-inch guns and the later ships 12-inch, though a 15-inch battery has been mentioned in connection with the *Hindenburg* and the *Ersatz Victoria Luise*.—*The Engineer*, 12/5.



PLANS OF GERMAN BATTLESHIP "GROSSER KURFÜRST"

—*The Engineer.*

GERMAN SUBMERGIBLE CRUISERS.—An article in the *Neue Zürcher Post* by the engineering expert Treitel is summarized in the *Rivista Marittima* for April, with some additional comments. According to the article, the principal characteristics of the submergible cruisers under under construction in Germany may be summarized as follows:

Displacement (submerged), 5000 tons; length, 126 meters; power (surface), 18,000 horse-power; surface speed, 26 knots; cruising radius from 18,000 to 20,000 miles; submerged speed, 16 knots; guns of medium caliber in one armored (re-enterable) turret; guns of small caliber with anti-aircraft mounts, capable of being housed in re-enterable conning tower; 30 torpedo-tubes with 2 reserve torpedoes for each, *i. e.*, a total of 90 torpedoes; 125 to 150 mines loaded aft with ready means for discharging.

Apropos of this data, it is pointed out that a length of 126 meters would call for about a 12 meter beam, and a depth of hull exclusive of turret of 7 meters. The surface displacement would be about 2500 tons, with a free-board of about 2.5 meters.

Although to secure the high power it would seem necessary to employ steam, with oil-burning boilers and turbine engines, the large cruising radius suggests internal combustion engines for surface cruising.

An economical cruising speed of 10 knots would require in a cruiser of that size about 1200 horse-power, which would require with Diesel motors from 300 to 360 kg. of oil per hour, or a consumption per mile of from 30 to 36 kg. Consequently a cruising radius of from 18,000 to 20,000 miles would call for about 600 tons of oil.

The disappearing conning tower and gun turrets are noteworthy features; but it is evident that in surface fighting these would need to be as elevated as possible, and hence removable when under water.

NEW GERMAN SUBMARINES.—According to the same article (Treitel, in *Neue Zürche Post*), the principal characteristics of the latest German submarines that have just had their trials are as follows:

Under water displacement, about 2400 tons; length over all, 85 meters; beam, 8 meters; height, excluding conning tower, 6 meters; surface speed, 22 knots; surface power, 7000 horse-power; submerged speed, 14 knots; cruising radius, 6500 miles; supplies for 6 to 8 weeks; 8 to 10 torpedo tubes of 550 millimeters; 4 to 8 guns of small and medium caliber, with disappearing mounts, some of them anti-aero; covered bridge and armored conning tower; 2 collapsible boats; 18 tons of detachable lead ballast; height of conning tower 4 or 5 meters.

The complement consists of 3 or 4 officers, 2 or 3 machinists, 1 medical officer, 40 or 50 petty officers and crew—a total of 50 to 60 men.

It is to be observed that a hull 85 x 8 x 6 meters would give a displacement of about 2000 tons, including water in free circulation in the tanks, making the figure given (2400 tons) seem somewhat excessive.

The surface displacement, assuming a free-board of 1.5 meters, would be about 1200 tons—a figure confirmed by the surface power and speed.

With Diesel motors, it may be assumed that the power is distributed over four shafts, with 1750 horse-power per shaft. It seems that the Germans have succeeded in constructing units of about 1800 horse-power; moreover, distributing 1750 horse-power over 8 cylinders, we have about 220 horse-power per cylinder, which is within limits already attained.

A cruising speed of 10 knots would call for about 800 horse-power, with about 240 kg. of gasoline per hour, or 24 kg. per mile; the radius of action of 6500 miles would require about 160 tons of naphtha.

According the statement of the German High Seas fleet commander, these units could undertake a voyage to the east coast of the United States and return without additional supplies. Treitel remarks that the hull is no longer formed of a single "skin," like a boiler, but is much stronger. It seems that the Germans have devised a system of double hull, in which the outer and inner are both resistent and strongly bound together. As a matter

of fact this method has already been employed in Italy and elsewhere. The hulls are strong enough to pass through nets and other entanglements, and to permit descent to a depth of from 100 to 150 meters. It is possible that compressed air may be employed, at least as a temporary expedient in passing through obstructions.

The submarines are provided with abundant equipment, including disappearing periscope, submarine bell, wireless telegraph and telephone, etc.—*Rivista Marittima,* April.

GREAT BRITAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
1 Ship	27,500	25	8 15-inch	.....	To be completed in 1917
Renown	25,750	22	same	.....	" " "
Repulse	25,750	22	same	.....	" " "
Resistance	25,750	22	same	.....	" " "
Revenge	25,750	22	same	Vickers	" " 1916
Resolution	25,750	22	same	Palmer	" " "
Ramillies	25,750	22	same	Beardmore	" " "

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

Battleships					
2 Rev'nge class	25,750	22	8 15-inch	.....	Completed 1915
5 Queen Elizabeth class	27,500	25	same	.....	" 3 in '15; 2 in '14
1 Battle Cr'ser					
Tiger	30,000	30	8 13.5-inch	.....	" in 1914
Light Cruisers					
8 Cl'p'tra class	4,400	30	....	.....	" " 1914-15
6 Arethusa class	3,600	30	....	.....	" " "
3 Birmingham class	5,440	25·5	....	.....	" " 1914

NOTE.—Approximately 31 destroyers and 21 submarines were building in July, 1914. Since the war no official information regarding naval matters has been available, but it has been reported that the number of vessels building has been increased to the full capacity of the ship yards and that new vessels have been laid down as fast as those building have been completed. Also it has been reported that five large battle cruisers of 32 knots speed are nearing completion and that a number of monitors carrying 14 inch guns are either built or building.

THE NAVY—AN ECONOMY.—According to the statement just issued by the Comptroller and Auditor General, during the financial year which ended on March 31 of last year, the fleet, instead of costing £51,550,000, required an expenditure of £103,301,862. In other words, eight months of war increased the outlay on the navy for the whole year by a sum equivalent to only 10 or 11 days of our present war expenditure. That sum is surely small in comparison with the services which the navy rendered during that period when the German fleet was imprisoned, German cruisers were hunted down and destroyed, German merchant ships were either captured or driven off the seas, vast military forces were convoyed to the various theaters of operations, and safe communication was secured on all the oceans of the world, enabling this country and its Allies to obtain food, raw material and munitions essential to victory.

REASSURANCES AGAINST MILITARISM.—At the annual meeting of the Grand Council of the Navy League which has just been held, the gathering * * * * ignored the main issue of the hour, namely, the indifference of the

public to all questions associated with our sea command. Admiral Sir E. R. Fremantle came nearest the point when he "expressed regret that at the recent Paris Conference our navy was not represented by a naval officer." The truth is that in these days the navy is represented practically nowhere. The navy is not represented in the Cabinet, as the other Allied fleets are represented in the Allied Cabinets; it is almost without voice in the two Houses of Parliament; and it is apparent that in the matter of the blockade, the expansion of our military forces, and the grievances under which officers and men suffer the Admiralty to-day exercises little influence.—*Naval and Military Record*, 4/5.

BRITISH PRIZE MONEY AND PRIZE CASES.—Dr. Macnamara, replying to a question with regard to prize money in the navy, stated that instead of, as in the past, making awards of prize money to the actual captor, the net value would be pooled and distributed among the whole fleet engaged in the war at the close of hostilities under an improved scale. This change was considered to be more fair all round, and gave the man who was engaged in fighting the enemy just the same chance as the man who was guarding the trade routes. This pooling naturally made distributions from time to time of what were called interim dividends impossible. The fleet had been instructed to send in to the Admiralty any applications for prize bounty which they might have to make. He mentioned that in the case of the *Carmania* for sinking the *Cap Trafalgar* the Prize Court had awarded £2115, and all necessary steps had been taken to pay the award out to the officers and crew.—*M. E. & N. A.*

ACCUMULATED PRIZE MONEY—INTERNED ENEMY SHIPS.—The Duke of Devonshire said that the total ammount of prize money under the Supreme Court Prize Deposit Account was, on May 10, £4,420,372. In addition there were moneys in the Indian and Colonial Courts, and part of these funds was at the disposal of the government and a special account was kept. The number of enemy ships detained in the United Kingdom and overseas ports was rather more than 200. He believed that in all cases those vessels had been or were being dealt with by the various prize courts concerned. Under the Prize Court Rules the government had power to requisition ships and to use them in the most useful and economical way, and many of them had been so employed. * * * * There were technical and practical difficulties in the way of immediate distribution, among them the difficulty of the realization of the value of the ships requisitioned. On the whole the government thought it would be advisable that they should await the conclusion of hostilities before making the distribution. The change of method would need legislation, but he thought it would not be opposed. As to whether the interest on the money would go to the officers and men, he believed the question had not yet been decided. Personally he held a very strong view that the interest should follow the capital.—*Marine Engineer and Naval Architect*, July, 1916.

CONTROL OF BRITISH AIR SERVICE.—The British Government, fortunate in the possession of two strong Air Forces under War Office and Admiralty, has experienced great difficulty in the attempt to conceive and organize a central control. The following extracts from editorials tend to show that there is not sufficient air in the United Kingdom for both services and point out efforts which are being made to coordinate the two services.—*J. W. G.*

THE AIR BOARD.—The Air Committee has been replaced by the Air Board, and, according to Mr. Bonar Law, this new body will have the sympathy of the War Committee. It is admitted that the new board will be advistory; it will be able to discuss, but will have no right to act. Lord Curzon is to be president, and Major Baird, M. P., will represent the House of Commons. Lord Sydenham will be a member because he is "of independent administrative experience," to quote the official phrase. For the rest, the navy will be represented by a member of the Board of Admiralty, "or someone else

who shall be present at its meetings when matters connected with the Air Board are under discussion." The Army Council will be represented by one of its members. There will be an additional naval representative and an additional military representative, "who need not always be the same individual." The board apparently will not do anything, but it will be entitled to make recommendations. "If either the Admiralty or the War Office decline to act upon the recommendations of the board, the president shall be free to refer the question to a War Committee." In this connection an interesting incident occurred. "Will he be bound to refer?" Sir Edward Carson asked. "Presumably," replied Mr. Tennant, "he will not." It has also been determined that in the event of disagreement between the board and the Admiralty or the War Office, "the decision would rest with the War Committee, who would give instructions through the Ministry of Munitions as they thought fit," if they approved of an order being given for a particular type of machine in which the board expressed its belief. The procedure hardly seems to promise efficiency. The board will talk things over, and will express an opinion to the president, the latter, knowing nothing of aeronautics, may or may not ask the War Committee to bring pressure on the Admiralty or the War Office if either of those authorities are in disagreement with the board, the War Committee, also knowing nothing of aeronautics, may or may not support the board; but if it does, it will give instructions through another authority, the Minister of Munitions. We agree with Mr. Churchill that in the choice of a policy the government has followed no principle unless it be that of postponement to the last possible moment, and then the taking of the line of least resistance. It will be noticed that Lord Montagu is not a member of the board, and Lord Derby is not regarded as indispensable.—*Naval and Military Record*, 24/5.

COMPETITION BETWEEN SERVICES.—The first and greatest need is to put a stop, once for all, to the cut-throat competition between the naval and military air services. The two have grown up separate and almost haphazard. They are necessarily employed in action, and must always be so employed, under the supreme direction of the naval and military commanders-in-chief respectively. No one questions that principle for a moment; but it does not in the least affect the case for the immediate creation of a single Air Service, in which the whole business of aircraft design and construction, of technical and meteorological research, of the enlistment and training of *personnel*, and of the development of air policy, will be finally and irrevocably pooled. * * * * The organization at home is utterly inadequate. In the matter of contracts the navy, as is natural, is probably far ahead of the army, but neither has shown any real conception of the vast scale on which the air-warfare of the future will be conducted. Machines are planned and ordered by fifties when they should be ordered by thousands. The larger policy is prevented by lack of foresight. Design limps after the last captured enemy aeroplane when it should be thinking ahead of the next imaginable German invention. The whole *personnel* needs overhauling. Ingenious inventors are set to manage great businesses. There has been no serious attempt to apply to aircraft construction the elaborate division and "assembling" of parts, which has gradually been introduced into the making of munitions. * * * * Every manufacturer knows the appalling waste and chaos which has come of competition between two government departments in placing rival orders. That state of affairs must be stopped once for all, as it can only be stopped, by uniting the two interests concerned. And, since there is a special relation in aircraft construction between the designer and the pilot, it follows that there must be amalgamation also—at least up to the point of active service—of the men who are to fly the machines in war. One disastrous effect of the fear of coming changes has been a spasm of competitive recruiting for both services. It looks as though each was anxious to have as strong a hand as possible for bargaining.—*London Times*, 16/5.

HOLLAND

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Cruisers					
.....	7000	30	10 6-in.	Amsterdam	Authorized
.....	7000	30	10 6-in.	Flushing	Authorized

NOTE.—Four submarines are building, three at Rotterdam and one at Flushing, of 836 tons displacement and a surface speed of 17½ knots.

ITALY

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Carraciolo.....	30,000	25	8 15-in., 16 6-in.	....	To be completed in 1917
Marcantonio-Colonna	30,000	25	same	....	" " "
Cristofaro-Colombo	30,000	25	same	....	" " "
Francesco-Marosini	30,000	25	same	....	" " "

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

Battleships					
Conte-di-Cavour	22,022	22.5	13 12-inch	....	Completed in 1914
2 Duilio class....	22,564	22.5	13 12-inch	....	" " 1915
Light Cruisers					
2 Campania class	2,500	16.5	6 6-inch	....	" " "

NOTE—In July, 1914, approximately 15 destroyers, 2 torpedo boats, and 8 submarines were building.

It is probable that the building program has been accelerated and increased since the outbreak of the war.

JAPAN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Yamashiro....	31,300	22.5	....	Kawasaki	To be completed in 1916
Ise	31,300	22.5	....	Mitsubishi	" " " "
Hinga.....	31,300	22.5	....	Yokosuka	" " " 1917

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

1 Battleship					
Fuso.....	30,600	22	12 14-inch	.....	Completed in 1915
2 Battle Cr's'rs					
Haruna class..	27,500	28	8 14-inch	.....	" " 1914-15

NOTE.—In July, 1914, Japan had 2 destroyers and 2 submarines under construction in England and France respectively.

JAPAN'S LATEST DREADNOUGHT.—The Japanese Navy Department has issued specifications for a new battleship which, according to press advices from Tokio, call for a main battery of 12 15-inch guns; displacement, 32,000 tons, and a speed of 24 knots. The new superdreadnought is also to have an improved defence against submarines.—*Army and Navy Journal*, 3/6.

JAPAN'S GREAT SHIP YARDS.—The largest shipbuilding establishment in Japan is the Mitsu Bishi Dockyard and Engine Works in Nagasaki. This yard has docks ranging in length from 350 to 714 feet and a patent slip capable of lifting a vessel up to 1000 tons gross. It also maintains a salvage steamer of 716 tons with a speed of 12 knots. It was considerably enlarged last year and had much modern machinery installed. The ships built at that yard in 1915 were the battle cruiser *Kirishima;* cargo steamers *Toyooka*, 7375 gross tons; *Toyama*, 7386 gross tons; and *Manila*, 9505 gross tons; tugboat *Manazuru*, 181 gross tons; torpedo-boat destroyer *Matsu;* destroyer *Kashiwa*, two oil barges, and pontoon for 34-ton floating crane. The work in hand on March 20, 1916, included battleship *Hyuga*, cargo steamers *Tokiwa*, 7252 gross tons; *Tsuruga*, 7252 gross tons; *Tsuyama*, 7252 tons; *Akita*, 3777 tons; *Yamagata*, 3777 tons; and another of 7332 tons; two vedette boats and steam pinnace for the *Hyuga;* torpedo-boat destroyer *Hamakaze*, and two cargo steamers of 7332 tons; two of 5150 tons, and two of 3777 tons. Besides this a large amount of repair work was also turned out. Ten thousand of the 30,000 workmen employed in the yard are engaged in shipbuilding.—*Marine Journal*, 1/7.

PORTUGAL

EFFECTIVE VESSELS IN PORTUGAL'S NAVY

Name	Displacement	Speed	Armament	Complement	Remarks
Battleships					
Vasco Da Gama	3,000	15	2 8-inch, 4 4.7-inch	220	Completed in 1877; refitted in 1903.
Cruisers					
Republica.....	1,640	17.5	4 5.9-in., 2 3.9-in.	273	Completed in 1901.
Sao Gabriel....	1,772	17	2 5.9-in., 4 4.7-in.	242	Completed in 1899.
AlnurariteReis	4,100	22	4 5.9-in., 8 4.7-in.	473	Completed in 1899.
Adamaster....	1,962	18	2 5.9-in., 4 4.7-in.	232	Completed in 1897.

NOTE.—In addition to the above Portugal has 5 gunboats, 6 destroyers, 3 torpedo boats, and 1 submarine. (2 gunboats, 2 destroyers, and 3 submarines are in process of construction.)

PORTUGUESE NAVAL INCREASE.—There has been great activity with regard to the Portuguese Navy and its arsenals during the last three months, since the state of war was declared in this country. Besides the repaired vessels, five ships—two of which were German—have been fully equipped and armed. Strenuous efforts are being made to obtain crews for other ships, 36 at Lisbon and 67 in all, including those in the colonies and islands.

Sweepers and dozens of patrols have been annexed to the naval division, and these, as well as two destroyers and two torpedo-boats, are constantly doing coast service. The sweepers have fished up the mines spread by the Germans, which caused so many disasters near the bar.

The defence of the port of Lisbon is well organized and divided into various sections, composed of batteries, semaphores and pilots, the whole forming a zone called here "the field of war." Strict orders forbid the entrance of any ships after dark and at any time without an "initialled" pilot.—*Herald*, 6/22.

RUSSIA

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Emperor Alexander III	22,435	21	12 12-in., 20 4.7-in	Nikolaieff	Commissioned 1915
Empress Marie	22,435	21	same	Ivan Bunge Co.	" 1914
Catherine II...	22,435	21	same	" " "	" 1915
Battle Cruisers					
Ismail.....	32,200	25	12 14-in., 21 5.1-in.	Galerni	To be completed in 1916 [1]
Kinburn.....	32,200	25	same	Baltic Works	" " "
Borodino.....	32,200	25	same	Galerni	" " "
Navarin.....	32,200	25	same	Baltic Works	" " "

VESSELS BUILDING IN JULY, 1914, AND NOW COMPLETED

Battleships					
4 Sevastopol class	23,026	23	12 12-inch	....	Completed in 1914
Light Cruisers					
6 Adm'l Greig class	7,500	32	....	....	" " 1914-15
2 Ad. Nevelskoi class	4,500	..	....	....	" " "

[1] Three completed.

NOTE.—Approximately 44 destroyers and 19 submarines were building in July, 1914. Official information regarding naval matters being unobtainable since the outbreak of war, it may be assumed that the ship yards have been kept busy to their utmost capacity and new vessels have been laid as fast as those building have been completed.

COMPLETION OF THREE BATTLE CRUISERS.—According to information regarded as reliable, the Russians have succeeded in adding three new capital ships to their Baltic fleet in the last three months. The keels for these vessels were laid before the beginning of the war, but construction work was greatly retarded in 1914 owing to the general demoralization arising during the first period of the war. In 1915, however, the ship work at Petrograd was pushed forward vigorously.

The great Poutiloff Works and the new Admiralty yards, both in the Cronstadt-Petrograd district, had been thoroughly reorganized early in 1915, and in the spring of that year were able to resume work with a higher degree of efficiency, it is said, than under the former managements. A great number of Germans had been employed in the Poulitoff Works up to the time the war began. This contingent disappeared early in August, 1914.

It is not stated definitely just which ships of those building have been added to the Baltic fleet, but the assumption is that they comprise three of the four 32,000-ton battle cruisers which were under construction in 1915 at the Baltic yards and at the new Admiralty yards.

Four Vessels Building.—These four vessels were known as the *Navarin*, the *Borodino*, the *Ismail* and the *Kinburn*. The *Navarin* and the *Borodino* were in the hands of the new Admiralty yards and the *Ismail* and the *Kinburn* were building in the Baltic yards. All four ships were engined for 27 knots speed, and the main battery designs called for 12 14-inch guns in each craft.

At the Poutiloff works there were in hand last year two 32-knot cruisers, said to be of a superscout cruiser class. These vessels are known as the *Admiral Boutokoff* and the *Admiral Spiridoff*. Each craft has a displacement of 7600 tons and a battery of 16 5.1-inch guns.

At the Reval yards two additional 32-knot cruisers were building, similar in every respect to the 32-knot vessels in hand at the Poutiloff plant. The Reval built ships are known as the *Admiral Greig* and the *Svietlana*.

At the beginning of the war Russia possessed in the Baltic the battleships *Imperator Parel I.*, of 17,400 tons; the *Sevastopol*, of 23,000 tons; the *Andren Perovzvannyi*, of 17,400 tons; the *Slava*, of 13,516 tons; the *Cesarevitch*, of 12,912 tons; the *Gaugut*, of 23,000 tons; the *Petropavlovsk* of 23,000 tons, and the *Poltava*, also of 23,000 tons. In addition, the Baltic fleet included the armored cruisers *Bayan*, of 7887 tons; the *Gromoboi*, of 13,220 tons; the *Pallada*, of 7900 tons; the *Rossia*, of 12,195 tons, and the *Rurik*, of 15,170 tons.

The total Baltic fleet at the beginning of the war consisted of eight battle ships and five armored cruisers. This force was far too weak to engage the German High Sea fleet, but with the addition of say three 32,200-ton battle cruisers the Russian force not only shows expansion, it is declared, but is assuming proportions which may readily be regarded as menacing to German prestige in the Baltic.—*New York Herald*, 12/6.

SPAIN

VESSELS BUILDING

Name	Displacement	Speed	Armament	Builders	Remarks
Battleships					
Alfonso XIII..	15,450	19.5	8 12-in., 20 4-in.	Ferrol	Launched May 7, 1913
Jaime I.....	15,450	19.5	same	"	Laid down Feb. 5, 1912

NOTE.—Spain's building program includes the following: 4 fast cruisers, 6 destroyers 28 submarines, 3 gunboats, and 18 coast-guard mine layers.

UNITED STATES

IN CONGRESS.—*Naval Appropriation Bill.*—The Senate Committee on naval affairs on June 30 submitted the following report on the naval appropriation bill:

The amount recommended in this bill is $315,826,843.55, or $45,857,588.81 more than carried by the bill as passed by the House of Representatives and $166,164,978.67 more than was appropriated in the naval appropriation bill for the fiscal year 1916.

Of the increase recommended in this bill over the bill as passed by the House, the bulk of it may be attributed to personnel and new ships, over $6,000,000 having been added on the former account and over $32,000,000 on the latter.

The bill as passed by the House authorizes 61,500 enlisted men in the navy, 3500 apprentice seamen, and 3079 additional marines. This bill authorizes 68,700 enlisted men in the navy, 6000 apprentice seamen, and 5029 additional marines, or an increase of 11,650 men in both arms of the service, and in addition 408 men in the hospital corps, the strength of which is fixed in this bill as 3½ per cent of the authorized enlisted strength of the Navy and Marine Corps.

In this connection this bill also gives the President authority, in case of a national emergency, to increase the authorized enlisted strength of the navy to 87,000 men and the enlisted strength of the Marine Corps to 17,400 men.

The bill as passed by the House authorizes 72 new ships to be built at once. This bill authorizes 157, 66 of which are to be begun as soon as practicable, the construction of the remainder to be begun prior to July 1,

NAVY DEPARTMENT
BUREAU OF CONSTRUCTION AND REPAIR
VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY, JULY 10, 1916

Name, type and no. of vessel	Contractor	Per cent of completion			
		July 1, 1916		June 1, 1916	
		Total	% on ship	Total	% on ship
Battleships					
38 Pennsylvania	Newport News S. B. Co.	Del'v'd	6-12-16	99.5	99.5
39 Arizona	New York Navy Yard	93.2	93.0	91.6	91.3
40 New Mexico	New York Navy Yard	35.6	27.7	30.8	23.9
41 Mississippi	Newport News S. B. Co.	47.4	38.2	45.7	35.9
42 Idaho	New York S. B. Co.	61.6	58.3	60.6	56.9
43 Tennessee	New York Navy Yard	0.0	.....	.....	.....
44 California	Mare Island Navy Yard	0.0	.....	.....	.....
Destroyers					
63 Sampson	Fore River S. B. Corporation	Del'v'd	6-26-16	94.7	94.5
64 Rowan	Fore River S. B. Corporation	90.0	89.8	86.3	85.8
65 Davis	Bath Iron Works	85.8	85.4	82.1	81.5
66 Allen	Bath Iron Works	84.3	83.7	81.0	80.2
67 Wilkes	Wm. Cramp & Sons	76.3	75.2	68.4	66.8
68 Shaw	Mare Island Navy Yard	36.3	35.7	33.5	32.5
69 Caldwell	Mare Island Navy Yard	0.0	.....	.....	.....
70 Craven	Norfolk Navy Yard	0.0	.....	.....	.....
71 Gwin	Seattle Construction & D. D. Co.	8.3	0.0	5.3	0.0
72 Conner	Wm. Cramp & Sons	6.5	2.8	5.6	2.5
73 Stockton	Wm. Cramp & Sons	6.6	2.8	5.6	2.5
74 Manley	Bath Iron Works	13.8	5.6	10.5	3.5
Submarines					
27 G-2[1]	Lake T. B. Co. (Bridgeport)	92.0	92.0	92.0	92.0
31 G-3[1]	Lake T. B. Co. (Bridgeport)	89.5	89.3	89.5	89.3
41 L-2	Electric Boat Co. (Quincy)	99.1	99.1	99.1	99.1
44 L-5	Lake T. B. Co. (Bridgeport)	87.3	86.4	87.0	86.0
45 L-6	Lake T. B. Co. (Long Beach, Cal.)	82.6	79.7	82.4	79.5
46 L-7	Lake T. B. Co. (Long Beach, Cal.)	81.5	78.7	81.3	78.4
47 M-1	Electric Boat Co. (Quincy)	96.8	96.8	96.0	96.0
48 L-8	Portsmouth, N. H., Navy Yard	87.5	84.5	87.0	84.5
49 L-9	Electric Boat Co. (Quincy)	99.1	99.1	96.0	96.0
50 L-10	Electric Boat Co. (Quincy)	99.1	99.1	96.0	96.0
51 L-11	Electric Boat Co. (Quincy)	95.7	95.7	91.8	91.8
52 Schley	Electric Boat Co. (Quincy)	20.8	11.1	16.8	7.1
53 N-1	Electric Boat Co. (Seattle)	59.5	49.3	57.1	47.0
54 N-2	Electric Boat Co. (Seattle)	59.5	49.3	57.1	47.0
55 N-3	Electric Boat Co. (Seattle)	59.5	49.3	57.1	47.0
56 N-4	Lake T. B. Co. (Bridgeport)	66.4	61.2	65.2	59.6
57 N-5	Lake T. B. Co. (Bridgeport)	65.6	60.4	64.1	58.8
58 N-6	Lake T. B. Co. (Bridgeport)	63.6	58.1	63.1	57.6
59 N-7	Lake T. B. Co. (Bridgeport)	63.7	58.1	63.1	57.4
62 O-1	Portsmouth, N. H., Navy Yard	0.0	.....	.....	.....
63 O-2	Puget Sound Navy Yard	0.0	.....	.....	.....
64 O-3	Electric Boat Co. (Quincy)	8.8	6.1	4.2	.....
65 O-4	Electric Boat Co. (Quincy)	8.8	6.1	4.2	.....
66 O-5	Electric Boat Co. (Quincy)	8.8	6.1	4.2	.....
67 O-6	Electric Boat Co. (Quincy)	8.8	6.1	4.2	.....
68 O-7	Electric Boat Co. (Quincy)	8.8	6.1	4.2	.....
69 O-8	Electric Boat Co. (Quincy)	8.3	5.6	4.2	.....
70 O-9	Electric Boat Co. (Quincy)	8.3	5.6	4.2	.....
71 O-10	Electric Boat Co. (Quincy)	8.3	5.6	4.2	.....
72 O-11	Lake Tor. Boat Co. (Bridgeport)	23.1	17.4	17.1	11.0
73 O-12	Lake Tor. Boat Co. (Bridgeport)	23.0	17.3	16.8	11.1
74 O-13	Lake Tor. Boat Co. (Bridgeport)	22.1	17.1	16.5	11.7
75 O-14	Cal. S. B. Co. (Long Beach, Cal.)	15.3	8.0	11.9	5.9
76 O-15	Cal. S. B. Co. (Long Beach, Cal.)	15.0	7.8	11.7	5.9
77 O-16	Cal. S. B. Co. (Long Beach, Cal.)	14.1	7.5	10.8	5.9
Fuel Ships					
14 Maumee[2]	Mare Island Navy Yard	99.7	99.7	99.7	99.7
15 Cuyama	Mare Island Navy Yard	69.4	67.3	63.0	60.2
Miscellaneous					
Bridge (Supply Ship No. 1).	Boston Navy Yard	71.5	70.0	66.0	64.7
Henderson (Transport No. 1.)	Phila. Navy Yard	66.5	64.5	63.3	61.9

[1] Contracts forfeited, vessels being completed New York Yard.
[2] Vessel now at Navy Yard, New York, for installation of engines.

1919. There follows a comparison of the bill as passed by the House and this bill as to new ship construction:

Type of vessel	House bill	This bill	To be begun as soon as practicable
Battleships	..	10	4
Battle cruisers	5	6	4
Scout cruisers	4	10	4
Torpedo-boat destroyers	10	50	20
Fleet submarines	..	9	..
Coast submarines:			
800-ton type	3	3	3
Smaller type	47	55	27
Submarine with Neff system of propulsion	..	1	..
Fuel ships	1	3	1
Ammunition ships	1	2	1
Hospital ships	1	1	1
Repair ships	..	1	..
Transports	..	1	..
Destroyer tenders	..	2	..
Fleet submarine tenders	..	1	..
Gunboats	..	2	1
Total	72	157	66

The amount carried in this bill toward the foregoing 66 vessels is $110,726,160. The total cost of the whole program of 156 vessels, which excludes the submarine to have the Neff system of propulsion, is estimated at $588,180,576, leaving to be appropriated $477,454,416. Other authorizations in this bill for objects other than new ships will require future appropriations of $10,737,611, making the total of appropriations to be made in future years for authorizations in this bill $488,192,027.

The committee considered it of the utmost importance to provide batteries for the merchant auxiliaries, which could be utilized in case of emergency or war. The department has carefully surveyed all the merchant vessels which could be so utilized, and as it was impossible to make any use of these without sufficient batteries, the committee considered it wise to provide for these.

The committee also realized that it was very important that the naval militia should be put on an equal basis with the national guard. Unless this was done the naval militia, which is now an important part of our naval establishment, instead of increasing would be lessened, as more inducement would be given to enter the national guard than the naval militia. The committee recommends legislation which puts the naval militia upon equality with the national guard. It also imposes upon the naval militia the same requirements in respect to drill and service that are required for the national guard; and they are subject to the call of the President in case of emergency or war, similar to the national guard.

The House provision for the naval reserve is retained in substance. This bill had been previously favorably reported to the Senate.[1]

It is believed by the committee that with the provisions for the naval reserve, the naval militia, and with the increased number of enlisted men, our navy will be adequately and efficiently manned for any contingencies that may arise. The President is authorized, in case of emergency or war, to increase the enlisted men to 87,000, which would give a full complement to all our ships fit for service. The committee considered this very important, as it is useless to build ships and not be prepared promptly to utilize them when needed.

[1] See May-June PROCEEDINGS.

The increase in the enlisted men of the navy necessitated a corresponding increase in the commissioned officers of the navy. An amendment is offered which the committee believes is just and fair and provides that officers shall be increased as the enlisted men of the navy are increased to a certain proportion. It is believed that this is not only just to the officers, but also will result in a more efficient navy, as a certain number of officers are indispensable to a certain number of enlisted men to have an efficient and well-balanced navy.

The repeal of the statute last year which required the retirement of a certain number of officers each year also necessitated an increased number of officers in order to provide for a flow of promotions. The amendment provides for the selection by merit in the line officers from commander up. The committee believes that this provision will result in having men of great efficiency and fitness in places of grave responsibility.

Provision is also made for the operation of the Coast Guard Service and the Light-house Service with the navy in time of emergency or war. Recently a statute was passed making these a part of the navy under such contingencies. The bill also provides several cutters for the use of the Coast Guard Service. These are much needed if the service is to be maintained in a state of complete efficiency.

The bill makes provision for aviation stations in order to add desirable facilities for the work of this service.

It seemed to the committee that the program for five years proposed by the general board is not sufficient to bring the naval force of the United States to the position which they ought to hold among the navies of the world at an early enough period. The committee therefore reduced the time covered by the program from five years to three years, the committee being convinced that the sooner we could get an adequate navy the better, as the navy must always be our first line of defence, and we have two great coasts to defend.

The committee increased the appropriation for ammunition for vessels from $11,245,925 to $19,485,500. This was made necessary on account of the increased number of ships to be built at once and for the authorizations to be constructed for the next two years. This furnishes a supply of ammunition for all of these ships when completed. The committee believes it would be wise to do this at once, as in case of emergency we would have this ammunition available for immediate use. The lessons of the present war have taught the urgent necessity of having a large supply of ammunition. This amount is much needed for naval purposes.—*Army and Navy Register*, 8/7.

DESIGN FOR NEW SHIPS.—In order to expedite the work on the increased naval building program, Mr. Daniels, Secretary of the Navy, has approved complete building plans for five classes of ships. They are: Scout cruisers, provision for the construction of which is included in the Naval Appropriation Bill now before the Senate; 20 destroyers, included in the same bill; one gunboat, one fuel ship and one hospital ship.

If the bill, when approved, makes provision for these ships the Navy Department, it is announced, will be ready to advertise for bids for their construction or to begin the construction of part of them in the navy yards immediately.

Prepare Submarine Designs.—In addition to this building program designs for 27 submarines also will be ready by the time the naval appropriation bill has been approved.

The technical forces of the Navy Department are at work on three other classes of ships—battle ship cruisers, battle ships and an ammunition ship. It is believed that the department will be ready to award contracts for their construction within six months after they have been approved by Congress.

The scout cruisers referred to will mark a tremendous advance in size,

speed, armament, and other essential characteristics over any ship of the same classes possessed by any other nation.

The design of the destroyers provides a marked increase in speed over previous United States vessels of the same class without deviating from the principles upon which stress has been laid in previous destroyers. These are the robust type of construction permitting them to make big speed in heavy weather and to accompany the battle ship fleet at all times; a heavier armament, as regards both guns and torpedoes, than is carried by destroyers in other navies; and a great cruising radius, which adds immeasurably to their value, both tactically and strategically.

The gunboat will be of a type designed especially for use in tropical waters and will be able both to keep the sea in any weather and to navigate comparatively shallow rivers. In addition to adequate armament and speed the outstanding characteristics of the vessel will be dependability and the provision of a maximum degree of comfort for her officers and crew during long periods of patrol duty.

The hospital ship will be the first vessel of its kind to be especially designed and built for the United States Navy, the two which saw service during the Spanish War having been ordinary merchant vessels converted for the purpose. Under the terms of the Geneva convention hospital ships are immune from capture and are not provided with military features of any sort.

The ship will have every sort of medical and surgical apparatus and other facilities to be found in the best equipped hospitals on shore. The vessel has been designed to meet in all respects the requirements of the Bureau of Medicine and Surgery, and Surgeon General Braisted and the other officers of that bureau have been untiring in their work to make the vessel complete in every respect.

The designs for all the vessels have been prepared by the Bureau of Construction and Repair in constant consultation with the other technical bureaus of the Navy Department. They have been approved by the General Board of the Navy as meeting the military requirements for vessels of their respective classes.—*New York Herald.*

LOSS OF NAVAL AUXILIARY "HECTOR."—The rescue of all the officers and crew and members of the company of marines on the naval collier *Hector*, disabled on July 14 in the hurricane off the South Carolina coast, was reported to the Navy Department on July 15 by the Charleston Navy Yard. The *Hector* is broken in halves and is believed to be a wreck. She was abandoned seven miles northeast of Cape Romain early in the morning of July 15. The officers, crew and marines left the collier in open boats and were rescued by the lighthouse tender *Cypress* and the tug *Wilmington*, which landed them at Charleston this morning. There were 12 officers and 70 men in the *Hector's* complement and one officer and 56 marines on board, all of whom were saved.

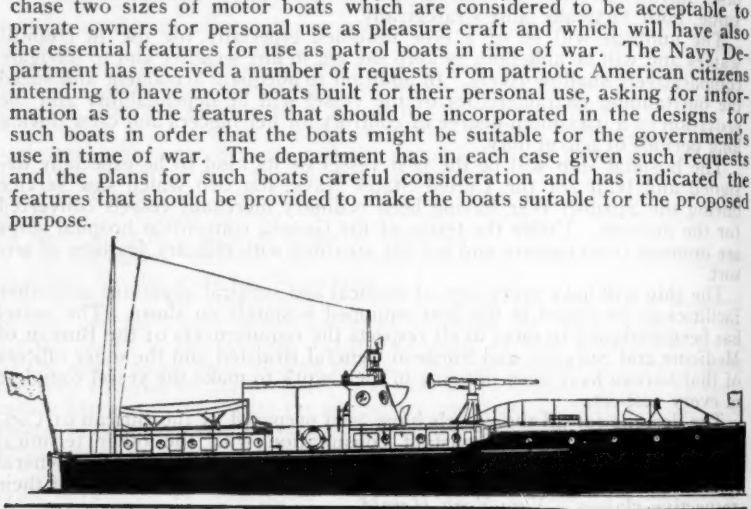
The *Hector* left Charleston Lightship on Wednesday. On Thursday morning at 4 o'clock she ran into the worst of the hurricane sweeping up the coast. Huge waves broke over the vessel and poured down the hatches, flooding the holds and disabling the engines. When she was unable to make way, wireless calls were sent out. As the big collier rolled at the mercy of the wind, which was driving her toward Cape Romaine, fire started in the hold. The flames did not gain much headway, but added to the terror of those aboard.

The *Wilmington* reached the collier at 1 o'clock Friday afternoon about one hour after the *Hector* had grounded. The *Hector's* launch had been disabled by the storm, but a small boat with a line put out and succeeded in reaching the tug. The dangerous work of transferring the men was immediately started and continued for six hours.

Captain Newell with about a score of men elected to remain on the forward part of the *Hector*, which then had almost parted amidships. The

Wilmington started for this port and the *Cypress* set out to take off Captain Newell and his men. At 8 o'clock last night Captain Newell and his men who remained with him were forced to leave the *Hector*. There were five men aboard each of the barges which the *Wilmington* lost while trying to tow them from Philadelphia to Jacksonville. The *Wilmington* put to sea to-day to search for them.—*New York Times*, 15 and 16/7.

NAVY MOTOR PATROL BOATS.—The Navy Department has decided to purchase two sizes of motor boats which are considered to be acceptable to private owners for personal use as pleasure craft and which will have also the essential features for use as patrol boats in time of war. The Navy Department has received a number of requests from patriotic American citizens intending to have motor boats built for their personal use, asking for information as to the features that should be incorporated in the designs for such boats in order that the boats might be suitable for the government's use in time of war. The department has in each case given such requests and the plans for such boats careful consideration and has indicated the features that should be provided to make the boats suitable for the proposed purpose.



EXPRESS POWER CRUISER, JUST ORDERED BY THE NAVY DEPARTMENT

THE ACCOMPANYING CUT AND DESCRIPTION TAKEN FROM THE "NEW YORK HERALD" OF JULY 10, FURNISH COMPLETE DETAILS OF THE CRAFT BEING BUILT BY THE LUDERS MARINE CONSTRUCTION COMPANY

The two boats when delivered will be assigned one to the navy yard, New York (Brooklyn), and the other to the navy yard, Boston (Charlestown), where the boats will be available for the inspection of yachtsmen and others interested.

Bids for these two boats were advertised and competition was invited on the basis of the designs to be submitted by bidders; the cost of the smaller boat being fixed by the advertisement at $12,000, the boat to be not less than 45 feet in length, and to have a speed of not less than 25 statute miles per hour, and the cost of the larger boat being fixed at $28,000, the boat to be not less than 65 feet in length, and to have a speed of not less than 30 statute miles per hour. The larger boat was to be suitable for mounting a three-pounder gun forward of amidships and the small boat to be suitable for mounting a one-pounder gun forward of amidships.

After a careful examination of the several competitive designs submitted award has been made by the Secretary of the Navy for the larger boat to the Luders Marine Construction Co., Stamford, Conn., the design offered by this company being considered to embody in the highest degree the features required in the type of boat contemplated by the advertisement, and for a similar reason the award for the smaller boat was made to George Lawley & Sons Corporation, Neponset, Mass.—*Army and Navy Register*, 7/1.

Description of Craft.—The design is a hollow bottom, wave collecting type, eliminating the crudenesses of its forerunner, the "V" bottom. In fact, under ordinary conditions at anchor and moderate speed the craft has all the indications of being a broad round bottom boat, hogged shear, raised forward deck with a very pronounced flaring plumb bow with the chime rounded and dissipated as soon as it emerges from the water.

The dimensions—66 feet over all, 13 feet 3 inches beam and 4 feet 6 inches draft—insure an unusually powerful hull, more stable on account of her width than the usual type. In spite of the speed of 30 statute miles an hour there is all the accommodation that good design demands of a craft of this size.

The living quarters of the owner are divided by the machinery compartment, which is amidship, and in this manner two distinct and private suites are obtained. In the after deck house, under a low cabin trunk, is located the main living room, a space about eight feet long, the full width of the boat, equipped with sofas, dining table and a full length hanging locker. A Pullman berth, with spring and mattresses concealed on one side and a spring upholstered extension settee on the other, afford comfortable sleeping facilities for two persons. Forward of this room, entered through a passageway, is a large galley on one side and a properly appointed lavatory on the other. Forward of the latter room is a wireless room, about four feet square, a space that, if a wireless is not installed, can be used as a dress closet and trunk room.

Forward of the machinery space, entered from a companionway on the main deck, is a stateroom complete with two beds, a bureau, seat, hanging locker and a connecting lavatory forward. The interior finish throughout in the owner's quarters is white with solid African mahogany furniture and trim. The crew's space is forward, provision being made to berth four men if desired. In addition there are proper storage spaces readily accessible for ammunition stowage.

In the middle of the vessel is located the unusual power plant that makes the proposition feasible; two 12 cylinder engines, approved by the government as the only machines available for the conditions, 6-inch bore, 7-inch stroke, driving twin screws, installed side by side with working space all around and complete with electric starters, air, bilge, whistle and gasoline pumps. These machines will be driven at about 1400 revolutions when under full load, developing about 800 horse-power all told, and will readily drive the boat at the guaranteed 30 miles an hour.

On account of the great radius of action required, 500 miles at 25 miles an hour, the gasoline supply is somewhat unusual, 1800 gallons being stored in three heavy copper tanks set in individual copper pans just aft of the motor, with a reserve tank of 300 gallons located in the lazaretto. Provision is made for carrying lubricating oil in tanks in quantities consistent with the fuel supply. Needless to say the boat will be illuminated by electricity, two independent .5 k. w. generating sets being installed. With these two sets the wireless outfit, the battery of three searchlights and the bank of storage batteries can be properly supplied.

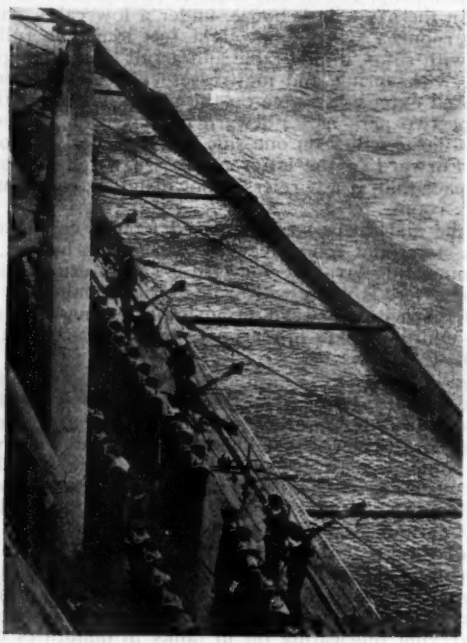
On deck a most commodious and unusual arrangement is presented. In addition to the after deck a bridge deck the full width of the boat and nine feet long is located between the two houses. A special steering station is located over the after end of the engine trunk; this affords a weatherproof covering over the entrance to the engine room, permitting it to be kept open in stormy weather. Large port lights and a hinged front to the conning tower permit of proper ventilation and observation. A shelter seat ranges across the front of the after house and is sheltered by an awning, an extension of the fixed roof of the conning tower.

The battery of three searchlights, two 9-inch arc and one 14-inch incandescent, are located on the tower top, operated from inside, and are a part of the assembly that includes a short spar carrying the forward end of the radio aerials. The mainmast is located at the end of the after house,

a somewhat unusual though not unpleasing location made necessary by the position of the three pound gun located over the forward engine-room bulkhead and commanding an unobstructed range of fire of 270 degrees.

Work on the boat was started at once; the boat when complete will be stationed at either the New York or Boston Navy Yard, where it will be open to inspection of all visiting yachtsmen as an example of what the United States Navy considers as the last word in a pleasure craft suitable for arduous patrol and submarine chasing service.

TORPEDO DEFENCE NET.—The Navy Department will shortly award a contract after competitive bidding for one wire net made up of 16 units, each unit 96 feet long and 36 feet deep, in accordance with a sketch which has



BRITISH WARSHIP LYING IN THE NORTH SEA,
PROTECTED BY A TORPEDO NET
(Photo from Paul Thompson)
—*New York Times*

been prepared in the bureau of ordnance. This net is intended for experimental purposes as a torpedo net. The bill contains a new appropriation for torpedo nets for battleships amounting to $480,000. This appropriation is to provide under-water protection against torpedo attack by dropping heavy steel nets from booms from the sides of the battleships. These nets are used when the battleships are at anchor and may be used while steaming, although materially reducing the speed of the ship to four or five knots. Information received from abroad indicates that these nets have been in general use in the navies of the belligerents.—*Army and Navy Register*, 6/17.

GUNS FOR MERCHANT AUXILIARIES.—The Secretary of the Navy has approved a plan of Rear Admiral Strauss for providing batteries for mer-

chant auxiliaries. There was recently instituted an inspection of merchant vessels under the flag of the United States with a view to their being called into service for use as auxiliaries in the navy in the event of war, the war plans contemplating the use of such vessels in numbers and for purposes as follows: Thirty-two fleet scouts, 20 district scouts, 15 mine planters, 60 harbor-patrol vessels, not less than 324 mine sweepers, 4 fleet colliers, at least 200 service colliers, 57 depot colliers, 7 fleet oilers, 35 or more service oilers, at least 5 depot oilers, 6 supply ships, 8 ammunition ships, 4 transports, 3 repair ships, 4 hospital ships, 3 mine depot ships, 2 destroyer tenders, 2 submarine tenders, 4 fleet tenders, and a large number of motor boats and like craft for patrol duty.

* * * *

The bureau of ordnance has estimated the requirements and says that for the purchase or manufacture of the requisite number of guns, mounts, and telescopes $3,291,183 will be needed, and for the ammunition $4,443,745, or a total for guns and ammunition of $8,734,938. In view, however, of the large appropriations for this year, the Navy Department feels that it should ask only $1,650,000 toward the manufacture of guns, mounts, and telescopes for merchant auxiliaries.—*Army and Navy Register*, 8/7.

AEROPLANE GUNS.—The battleship squadron of the Atlantic fleet will leave to-morrow in conjunction with the destroyers for the first war game practice of the season in northern waters.

One of the most interesting experiments of the present tactical maneuvers will be the testing for the first time of the aeroplane guns mounted on board the *Texas*, in the sixth division, in command of Rear Admiral Augustus F. Fechteler. These guns were mounted on top of the forward and aft turrets of that battleship at Boston and will be put to an actual test for the first time this week. They are of 3-inch caliber and are designed to make their range complete from any quarter.

Although no flying boats will accompany the fleet, kites on board the various other battleships of the squadron will furnish targets for subcaliber practice.—*New York Herald*, 10/7.

ARMORED AUTOS FOR SHIPS.—Armored automobiles cradled on the decks of warships, in seagoing rafts, for use of detachments of the United States Marine Corps in shore operations, soon may be added to the regular equipment of naval vessels.

Experiments at the Boston Navy Yard a few days ago demonstrated that such cars can be stowed aboard by means of electric cranes on war vessels in a very few moments, and that the deck space they occupy is very small.

United States marines found great need for armored cars in their recent operations in Mexico, Haiti and Santo Domingo, but the cars they used had to be shipped to them by regular naval transports.—*Washington Star*, 1/7.

MOTOR BOATS FOR COAST DEFENCE.—The efficient service rendered by the motor boat owners of Great Britain, many of whom have become expert submarine hunters, has led to a realization that the 10,000 motor boats between New London, Conn., and Barnegat Inlet, would prove an invaluable aid to the fleets of the navy in case of an attempted invasion.

A call for the owners of these motor boats to enroll for the defence of the country was issued July 8 by the Civilian Committee of the Naval Training Cruise of 34 Pine Street, which has made arrangements for the boats to take part with the battleships in a week of harbor defence work in September. The Navy Department has inaugurated a civilian training cruise of four weeks starting on August 15 and lasting until September 12. The last week of these manuevers will be devoted to harbor defence work, in which motor boats, as well as steam yachts and gasoline boats, will be mobilized and drilled to demonstrate how they can be best utilized in time of war.

Many of the yacht and motor boat owners who intend to take part in this week of maneuvers will also take the preliminary weeks of instruction to be given on the cruise.

Only boats which have been enrolled previous to August 1 and accepted after inspection by naval officers will be allowed to participate in the cruise. Owners of boats need not enroll at the Naval Recruiting Station unless they enroll for the full month's cruise. They will be at liberty to command their own boats during the week of the motor boat maneuvers and will be held responsible for the conduct of their crews. During the week of motor boat maneuvers instruction will be given in scouting, searching, patrolling, signaling, maneuvering by signals, defence of naval districts, study of coasts, piloting, and all the other duties they might be called upon to perform.

The boats are to be divided into four classes.

Class A, which will consist of boats able to make 20 statute miles an hour. They must be seaworthy and able to make a coastwise trip under ordinary conditions. They must also be able to carry and house four men, and must be able to maintain themselves for at least 48 hours and have a cruising radius of 100 miles. They must be so constructed and be sufficiently stable to carry a 1-pounder rapid-fire gun, which weighs 400 pounds. They must have a yard and mast fitted with a yard for flag-hoist signaling, and either electric or oil lamps for signaling at night. Their equipment must include two sets of international code signals.

Class B, which will consist of boats filling the same requirements as Class A, except that they must have a speed of at least 10 miles an hour.

Class C, which will consist of boats having a speed of at least 15 statute miles an hour; that can run under ordinary weather conditions in harbors or bays; that have suitable accommodations for three men; that are self-sustaining for 24 hours and have a cruising radius of 50 miles; that are able to carry a gun in a suitable position for temporary use, such as a Colt automatic or other machine gun, mounted on a tripod, the total weight of which is about 45 pounds, and which carry signal lamps and wigwag and semaphore flags for hand signaling.

Class D, which will consist of all boats not fulfilling the requirements of the other classes, but which are accepted as suitable after inspection by naval officers.

At the end of the week of the motor boat maneuvers, the men in command of the boats will be given a certificate stating the nature of the service they have performed, the efficiency they have displayed and the rating their boats are qualified to hold. The enrollment of the owners for the week of maneuvers does not involve any obligation other than obedience to orders during the week.—*New York Times*, 9/7.

THE FIRST VOLUNTEER PATROL SQUADRON.—The five little express cruisers of the Volunteer Patrol Squadron and two other craft of similar type, one the *Caddy II* and the other the mother ship of the squadron, the *Dragon*, recently completed some useful and interesting maneuvers off Newport, R. I.

Patrol craft Nos. *1*, *2*, *3*, *4* and *5* maintained a speed of about 24 miles an hour, while the *Caddy II*, which accompanied the others, showed a speed of about 29 miles an hour and, during the time that elapsed between the day they left West Lynn and the conclusion of the maneuvers off Newport she rendered numerous other services, chiefly dispatch work, and never faltered for an instant. During the chase for the submarines the *Caddy* would attract the attention of their single eye and the others would dash upon them from astern.—*New York Herald*, 26/6.

Following the report by Rear Admiral Austin M. Knight, in command of the second naval district, to the Navy Department on the recent maneuvers of the volunteer scout patrol motor boats, word came from the Navy Department making the ma permanent addition to the defence of this district.

There are five boats, commanded as follows: *No. 1*, A. Loring Swasey; *No. 2*, Stewart Davis; *No. 3*, Frederick Humphreys; *No. 4*, Hermann Oelrichs, and *No. 5*, Rowland Crosby Nickerson. Two other boats are under construction and will join the squadron soon.

Although the expense of the squadron will be borne by private enterprise, the boats will be officially attached to the defence of the second naval district, and in time of war will become a part of the United States Navy. —*New York Herald*, 7/7.

NAVAL AVIATION SCHOOL.—The aviation sections of the First and Second Battalions of the New York Naval Militia opened their aviation school yesterday at Bay Shore, L. I. The complement of both sections number more than 30 men.

They will camp there for two weeks, the men living in tents, which were pitched yesterday. The hydroaeroplane of the First Battalion will be housed in a canvas hangar, while that of the Second, which is of a different type, will be anchored off the shore when not in use. The machines will be kept constantly in flight, as it is planned to give each member of both sections as much flying as possible. It is expected that a number of the men will qualify for the pilot's licenses, as they have already been flying for some time.

The work of training the men has been held back by lack of hydroaeroplanes, and the First Battalion is raising a fund to buy another. The aeronautical branch of the Naval Militia is most important, and the officers and men are most anxious to obtain enough machines to enable all to receive their training and to form an aero reserve in case of war.—*New York Times*, 16/7.

CHANGES IN FLEET COMMAND.—An unusually large number of changes in important commands were issued by the Navy Department during the week. These orders include the detachment of Admiral F. F. Fletcher as commander-in-chief of the Atlantic fleet and the detail of Vice Admiral Mayo to succeed him. Read Admiral De Witt Coffman becomes vice admiral of the fleet, vice Mayo, and is placed in command of the battleship division. Rear Admiral H. O. Dunn has been assigned to command the Fifth Division of the Atlantic fleet, and Rear Admiral A. F. Fechteler the Sixth Division. Commander L. C. Palmer becomes chief of staff to Vice Admiral Coffman. Commander O. P. Jackson becomes chief of staff to Admiral Mayo.—*Army and Navy Journal*, 17/6.

BUREAU OF OPERATIONS.—What the Bureau of Operations, which was created 14 months ago, has done to co-ordinate the navy's activities and to put it on a more efficient basis was detailed by Rear Admiral William S. Benson, Chief of Operations, at a banquet given by the Naval Academy.

Responding to the toast, "The Navy," Admiral Benson said that Secretary Daniels's creed was 100 per cent efficiency for men and ships, and that the Operations Bureau had made possible a long step toward realization of such a policy, under which every unit of the fleet will at all times be ready to perform its functions, whatever the occasion that may require its services.

Only the fragments of organization existed in the Navy Department before the bureau was created, Admiral Benson said, and his work necessarily began at the bottom. There was no assembled data with which to work, he declared, not even adequate information as to the naval strength of other countries. To find what ship was available for special duty was a task of several months' inquiry.

Outlining what has been accomplished by the bureau, Admiral Benson cited the mobilization of communications systems recently demonstrated by the department, the reorganization of the entire naval service with flag officers in command of all distinct divisions; the measures taken to develop the submarine and aviation service; reorganization of the reserve ships

with adequate crews of highly trained men capable of breaking in quickly volunteers in time of war; arrangements for mobilization of the naval militia and the establishment of summer training cruises for citizen volunteers; mapping out plans for advance and submarine bases; preparation of annual maneuver and cruising programs for the fleet which are carried out strictly on schedule; co-operation through councils composed of bureau officials and the Naval Consulting Board.

A thoroughly digested and well-developed plan of mobilization for the entire fleet in the event of war has been submitted to the department and approved.—*New York Times*, 2/6.

NAVAL PERSONNEL LEGISLATION.—The provisions relating to the commissioned personnel as at present incorporated in the bill[1] are as follows: "Hereafter the total number of commissioned officers of the active list of the line of the navy, exclusive of commissioned warrant officers, shall be 4 per centum of the total enlisted strength of the active list authorized by law; provided, that such total number shall be distributed in the proportion of 1½ in the grade of rear admiral, to 4 in the grade of captain, to 8 in the grade of commander, to 14 in the grade of lieutenant commander, to 32½ in the grade of lieutenant, to 40 in the grade of lieutenant, junior grade, and ensign, inclusive.

"And that the total number of commissioned officers of the active list of the following-mentioned staff corps, exclusive of commissioned warrant officers, shall be distributed in the various grades of the respective corps as follows:

"Medical corps: 1½ medical directors with the rank of rear admiral to 4 medical directors with the rank of captain to 8 medical inspectors, to 18 surgeons, to 68½ in the grades below surgeon; provided that hereafter appointees to the grade of assistant surgeon shall be between the ages of 24 and 32 at time of appointment."

[The full committee amended this to read "1½ deputy surgeons general with the rank of rear admiral, to 4 medical directors with the rank of captain," etc.]

"Pay corps: 1½ pay directors with the rank of rear admiral to 4 pay directors with the rank of captain, to 8 pay inspectors, to 86½ in the grades below pay inspector."

[The full committee amended this to read "1½ deputy paymasters general with the rank of rear admiral to 4 pay directors with the rank of captain," etc.]

"Construction corps: 1½ naval constructors with the rank of rear admiral, 5½ naval constructors with the rank of captain, to 14 naval constructors with the rank of commander, to 79 naval constructors and assistant naval constructors with rank below commander; provided, that vacancies in the construction corps shall be filled in the manner now prescribed by law, at such annual rate as the Secretary of the Navy may prescribe.

"Corps of civil engineers: 1½ civil engineers with the rank of rear admiral, to 5½ civil engineers with the rank of captain, to 14 with the rank of commander, to 79 civil engineers and assistant civil engineers with rank below commander; provided, that the total authorized number of commissioned officers of the active list of the following staff corps, exclusive of commissioned warrant officers, shall be based on percentages of the total number of commissioned officers of the active list of the line of the navy, as follows: Pay corps, 12 per cent; construction corps, 5 per cent; corps of civil engineers, 2 per cent; and that the total authorized number of commissioned officers of the medical corps shall be 65-100 of one per cent of the total number of officers and enlisted men of the navy and marine corps; and that officers in the lower grades of the pay corps, the construction corps, and the corps of civil engineers shall be advanced in rank up to and includ-

[1] Appropriation.

ing the rank of lieutenant commander with the officers of the line with whom or next after whom they take precedent under existing law.

"Chaplains: 1½ chaplains with rank of rear admiral, to 5½ with rank of captain, to 14 with rank of commander.

"Provided, that for the purpose of determining the authorized number of officers in any grade or rank of the line or of the staff corps, there shall be excluded from consideration those officers carried by law as additional numbers, including staff officers heretofore permanently commissioned with the rank of rear admiral, and that nothing contained herein shall be held to reduce below that heretofore authorized by law the number of officers in any grade or rank in the line or staff corps.

"Provided, that hereafter the pay and allowances of officers in the upper half of the grade or rank of rear admiral in each corps and chiefs of bureaus shall be that now allowed by law for the first nine rear admirals, and the pay and allowances of officers in the lower half of the grade or rank of rear admiral in each corps shall be that now allowed by law for the second nine rear admirals.

"Provided, That when there is an odd number of officers in the grade or rank of rear admiral in each corps, the lower division thereof shall include the excess in number, except when there is but one.

"Whenever a final fraction occurs in computing the authorized number of any corps, grade, or rank in the naval service, the nearest whole number shall be regarded as the authorized number; provided, that at least one officer shall be allowed in each grade or rank herein established.

"Chief boatswains, chief gunners, chief machinists, chief carpenters, chief sailmakers, chief pharmacists, and chief pay clerks shall, after six years from date of commission, receive the pay and allowances that are now or may hereafter be allowed a lieutenant (junior grade); provided, that chief boatswains, chief gunners, chief machinists, chief carpenters, chief sailmakers, chief pharmacists, and chief pay clerks shall, after 12 years from date of commission, receive the pay and allowances that are now or may hereafter be allowed a lieutenant, U. S. Navy.

"That warrant officers shall receive the same allowances of heat and light as are now or may hereafter be allowed an ensign; that warrant officers shall be allowed such leave of absence, with full pay, as is now or may hereafter be allowed other officers of the navy.

"That any commissioned warrant officer of the active list who shall have had six years' service as a commissioned warrant officer may be commissioned with the rank of lieutenant (junior grade) in the corps to which he belongs upon satisfactorily passing such examination as may be prescribed by the Secretary of the Navy and upon recommendation of the examining board composed of three officers not below the rank of lieutenant commander.

"Provided, that hereafter promotion to the grades of captain and rear admiral shall be by selection from the next lower respective grade; provided, that no officer shall be eligible for promotion by selection to either the grade of rear admiral or the grade of captain until he shall have been recommended for appointment to such grade by a board of nine flag officers of the line of the navy, which board will base its recommendations upon the comparative probable fitness for command afloat in the respective grades into which promotion is to be made of all captains or commanders, respectively, of the line of the navy who shall at the time the recommendation is made have had not less than three years' service in the grade in which they are then serving, except that the recommendation of the board in the case of officers of the former engineer corps who are restricted by law to the performance of shore duty only, and in that of officers who may hereafter be assigned to engineering duty only, shall be based upon their comparative fitness for the duties prescribed for them by law, and that upon promotion they shall be carried as additional numbers in grade; provided, that no officer shall be recommended for such promotion unless he shall have received the

recommendation of not less than seven members of said board; provided, that any officers so selected shall, prior to promotion, be subject in all respects to the examinations prescribed by law for officers promoted by seniority, and in case of failure for any reason to pass such examination such officer shall lose his then existing opportunity for promotion and such examination shall not be considered in the event of subsequent retirement to entitle such officer to the rank of the next higher grade.

"For purposes of retirement, all officers now in the navy or marine corps shall be credited with service from the dates they take precedence in accordance with law.

"Nothing contained in this act shall be construed to reduce the pay or other benefits of any officer of the navy or marine corps as now provided by law."

A paragraph devoted to "officers for engineering duty only," as it passed the House has been amended so that line officers "not below the grade of lieutenant commander" may upon application be assigned to this exclusive duty. There is retention of the House provision of the authority for the appointment of graduates of engineering schools for the performance of engineering duty at the rate of 30 annually for ten years. The House clause is amended to make these appointees "ensigns" instead of "acting ensigns." They are to be "regularly" commissioned in the grade of lieutenant, junior grade, after satisfactorily passing an examination "to qualify for the general duties of the line." The committee has rejected the House division that these appointees shall be required to perform engineering duties only.—*Army and Navy Register*, 1/7.

NAVAL MILITIA AND NATIONAL NAVAL VOLUNTEERS.—The House committee on naval affairs has favorably reported the bill (H. R. 16602) to promote the efficiency of the naval militia, to provide for the service of the naval militia in time of war and for other purposes. The report says:

"This bill places the naval militia of the various states in the same status as far as is practicable as the bill to reorganize the army, approved June 3, 1916, places the national guard of the various states. The rates of pay proposed are in accordance with the rates provided by law for members of the national guard, and unless the rates of pay of both organizations are the same, it will be difficult to maintain the naval militia. In order that any member of the naval militia may receive the pay prescribed in the bill, he must be enrolled in a new organization created under the terms of the bill called the 'National Naval Volunteers.' The creation of this organization is to effect the practical federalization of the naval militia so that they may be called upon to perform duties beyond the continental lines of the United States in time of war or in an emergency determined by the President of the United States.

"The status of the officers and enlisted men remains the same as under the terms of the naval militia act approved February 16, 1914, except that the terms for the enlisted men is three years with the privilege of extending their enlistment for one, two, or three years longer, and in order that the officers and men may draw the pay prescribed under the terms of this bill, the number of drills has been materially increased over the act of February 16, 1914. The bill also provides for a system of administration of justice and discipline in the naval militia, but its provisions are not as severe as exist in the regular service, as it is not expected that one who devotes only part of his time to naval instruction should be expected to submit to the discipline of one who has made it a life profession. The bill under consideration, therefore, changes existing law in only three major particulars; first, the creation of the National Naval Volunteers; second, the increase in pay to correspond with the pay of the national guard; and, third, provisions for discipline and administration of justice. In addition to these, other minor changes are made, but are not of such a nature as to materially change existing law.

"The bill meets the approval of the Navy Department and of the representatives of the various naval militias of the various states, and is agreed to unanimously by the committee.

"The naval militia at the present time amounts to about 9000 officers and men, and the estimated cost incurred by the passage of this bill amounts to $885,000 for the next fiscal year.

"The Secretary of the Navy recommends the passage of the bill.—*Army and Navy Register*, 1/7.

NAVAL RESERVE FORCE.—The report of the House Committee on naval affairs contains the following relating to the proposed naval reserve:

The Navy Department is lending every assistance possible to the naval militia of the various states which have been organized and are now more or less subject to federal control. At present the naval militia amounts to 7,706 men and 606 officers.

The navy of the United States has another naval reserve in the form of the Coast Guard, which under existing law automatically comes under the control of the Navy Department in time of war or in an emergency declared by the President. The bill contains recommendations whereby the associated service of the navy and the Coast Guard shall take place immediately upon the declaration of war, and provisions regulating the jurisdiction, rank, and pay of officers and men and the duties of the Coast Guard are prescribed. This very efficient reserve numbers 255 commissioned officers and 3,886 warrant officers and enlisted men specially skilled in duties afloat and duties of coast protection.

From the above it will be seen that the naval militia, the Coast Guard, and the existing naval reserve numbers 861 officers and 11,995 men.

In order to increase the reserve in the navy the committee recommends the adoption of the provisions in the bill relating to a naval reserve force. This force consists of six classes:

1. The fleet naval reserve.
2. The naval reserve.
3. The naval auxiliary reserve.
4. The naval coast-defence reserve.
5. The volunteer naval reserve.
6. The naval reserve flying corps.

The naval reserve force is to consist only of citizens of the United States and may be called into service by the President in time of war or national emergency. Officers shall have the same rank and rating not above lieutenant commander as in the regular navy. Enrollment shall be for four years, but a member in time of peace may be discharged on his own request.

When first enrolling a provisional rank or rating is given until qualified by service with the regular navy; when the rank or rating is confirmed, a minimum service for each class is required before confirmation in such rank or rating. No member can be appointed or commissioned an officer until examined by a board of naval officers not below the rank of lieutenant commander. During the provisional rank or rating retainer pay of $12 per year is allowed, and this retainer pay is in addition to any pay received for active service; but in no case shall any pay be allowed unless the regulations in all respects are obeyed. Twenty-five per cent increase of retainer pay is allowed for continuous service in the reserve, and at the end of 20 years' service in the reserve a cash gratuity is allowed equal to the total retainer pay of the last enrollment. Enrollment in the reserve shall not prevent a member holding other public office. When members of the reserve are employed with the navy they shall have in all respects the same status as officers and men of the navy subject to the conditions heretofore stated. When actively employed with the navy they shall be governed by the laws and regulations for the government of the navy. Members of the reserve are entitled to wear a badge or button, and any person not a member of the reserve who wears such a badge or button is subject to a fine

or imprisonment or both. Private vessels or vessels of the merchant service commanded by officers of the naval reserve force may fly a flag or pennant to be prescribed by the Secretary of the Navy.

All members of the reserve are required to serve throughout the war and in time of peace receive a uniform gratuity of $50 for officers and $30 per man, which is increased in time of war to $150 for officers and $60 for men. All civilian crews of naval auxiliaries in order to serve on such must within two years be enrolled in the reserve.

Members of the reserve may be transferred from one class to another.

Fleet Reserve.—The first class, composing the fleet naval reserve, shall be composed of ex-officers and ex-enlisted men of the navy honorably discharged after four years' service. Enlisted men of the navy with 20 or more years' service or 16 years' service with honorable discharge may be transferred to the fleet reserve upon voluntary application and continue there until discharged by competent authority. Members of this class must do three months' active service with the navy in each enrollment or suffer a reduction in pay. The pay of this class per annum is $30 for less than eight years' naval service, $60 for more than 8 years and not less than 12 years' naval service and $100 for 12 or more years' service for members not directly transferred from the regular navy. Members of the fleet reserve transferred directly from the navy after 16 or 20 years' service receive the annual retainer pay of one-third and one-half, respectively, of base pay in the navy with permanent additions at the time of transfer, but all pay is forfeited upon the failure to obey orders. No member of the fleet reserve can be discharged therefrom without his own consent except by sentence of court-martial and, after 30 years' service, combined service in the navy and fleet reserve, may be placed on the retired list of the navy. Men on the retired list of the navy may be called into the service in time of war.

Naval Reserve.—The second class composing the naval reserve must be members of the seagoing profession between the ages of 18 and 35 years. Officers must have had two years' sea service, and officers and men of two or more years' service must have three months' active service with the navy before confirmation during each enrollment. The retainer pay of this class per annum is two months of the navy pay for same rank or rating.

Naval Auxiliary Reserve.—The members of this class are persons of the sea-going profession who serve on vessels listed as naval auxiliaries and who agree to serve on such vessels in time of war and to serve only on merchant ships. The qualification of this class are to be determined by the requirements of the merchant-ship type performing naval auxiliary service. The retainer pay of this class after confirmation is: Officers, one-half a months' pay, and men, two months' pay of the same rating in the navy.

Naval Coast-Defence Reserve.—Members of this class are persons capable of doing useful service for coast defence and serving on coast-defence vessels. Owners of motor boats and yachts may be enrolled and contracts may be entered into for the payment of an indemnity for vessels to be taken over in case of war. Three months' active service is necessary before confirmation in rank or rating in this class.

Thirty thousand dollars is appropriated to establish schools or camps of instruction at such times and in such localities as the Secretary of the Navy may deem advisable for the purpose of instructing members and applicants for membership in the naval reserve force.

Volunteer Naval Reserve.—The members of this class are persons who are eligible for enrollment in any one of the other classes and who obligate themselves to serve in the navy in any office of the said classes without retainer pay and uniform gratuity in time of peace.

Naval Reserve Flying Corps.—Members of this class are persons transferred from the flying corps of the navy and surplus graduates of the aeronautic school herein recommended to be established. It may be composed also of citizens skilled in flying after passing examination, and mem-

bers upon request may be given active service from two weeks to one month in any one year and receive the pay of a naval flyer.

Marine Corps Reserve.—A Marine Corps reserve is also recommended to be composed of ex-officers and ex-enlisted men of the Marine Corps and is established under the same conditions in all respects (except as may be necessary to adopt the said provisions for the Marine Corps) as those providing for the fleet naval reserve.—*Army and Navy Register, 3/6.*

THE CHIEF OF NAVAL OPERATIONS.—The Senate agrees to the House provision that Chief of Naval Operations while so serving as Chief of Naval Operations shall have rank and title of admiral, to rank after the Admiral of the navy and receive $10,000 per year and no allowances, and shall have as assistants 15 of and above rank of lieutenant commander of the navy or major of Marine Corps, and adds the proviso:

That hereafter the Chief of Naval Operations shall, under direction of Secretary of Navy, be charged with operations of fleet, with preparation and readiness of plans for its use in war. This shall include direction of Naval War College, Office of Naval Intelligence, Office of Target Practice and Engineering Competitions, operation of Radio Service and of other systems of communication, operations of Aeronautic Service, of Mines and Mining, of Naval Defence Districts, Naval Militia, and of Coast Guard when operating with navy; direction of all strategic and tactical matters, organization, maneuvers, target practice, drills and exercises, and of training of fleet for war; preparation, revision, and enforcement of all tactics, drill books, signal codes, and cipher codes. Orders issued by Chief of Naval Operations in performance of duties enumerated in this paragraph shall be considered as emanating from Secretary of Navy and shall have full force and effect as such. Chief of Naval Operations shall be charged with preparation, revision, and record of Regulations for Government of Navy, Naval Instructions, and General Orders. He shall advise Secretary concerning movements and operations of vessels of navy and prepare all orders issued by Secretary in regard thereto, and shall keep records of service of all fleets, squadrons, and ships. He shall advise Secretary in regard to military features of all new ships and as to any proposed extensive alterations of a ship which will affect her military value, and all features which affect military value of drydocks, including their location; also as to matters pertaining to fuel reservations and depots, location of radio stations, reserves of ordnance and ammunition, fuel, stores and other supplies of whatsoever nature, with a view to meeting effectively demands of fleet. In preparing and maintaining in readiness plans for use of fleet in war he shall freely consult with and have advice and assistance of the various bureaus, boards and offices of department, including Marine Corps headquarters, in matters coming under their cognizance. After approval of any given war plans by Secretary it shall be duty of Chief of Naval Operations to assign to bureaus, boards, and offices such parts thereof as may be needed for intelligent carrying out of their respective duties in regard to such plans. Chief of Naval Operations shall from time to time witness operations of fleet as an observer. He shall *ex-officio* be a member of General Board.—*Army and Navy Journal, 1/7.*

NAVIGATION—RADIO

RADIO EQUIPMENT OF GERMAN AIRSHIPS.—It is gathered from reports that the new German naval and military airships are equipped with wireless apparatus of greater range than that employed heretofore. The aerial largely used in connection with the wireless installations on Zeppelins is said to consist of a phosphor bronze wire that is paid out from a spool as the airship rises, to its length of 750 feet. The radio equipment is extremely compact, and power is furnished by a small generator weighing 270 pounds. The apparatus is such that the danger of sparks, either in the

instruments themselves or in neighboring objects through the influence of induction, is reduced to a minimum. Every large aerodrome in Germany has a wireless station, which enables the airships to keep in touch with their bases. The Zeppelins have a range of about 120 miles, and when it is remembered that the messages may be relayed from one craft to the other, it becomes obvious that on many of the raids over England the commanders of the airships no doubt remain in communication with the authorities at home.—*Scientific American*, 8/7.

RADIO DIRECTION FINDER.—The following is republished for the benefit of navigation:

The attention of all ships navigating the waters in the vicinity of Cape Cod is called to the installation at the United States Naval Radio Station, North Truro, Mass., of the Bellini-Tosi direction finder.

The purpose of the direction finder is to ascertain the true bearing by radio waves of a ship from the radio station, North Truro, as well as the true direction of the radio station from the ship, thus affording a new aid to navigators in determining their position by radio. It must be understood that this apparatus is still in an experimental stage and too much confidence should not be placed in the bearings given. From tests already conducted the direction finder has been found to be correct within about two degrees.

All merchant vessels fitted with radio are requested to cooperate with the department in these experiments, and whenever within 100 miles of North Truro should request their bearings from that station and inform North Truro how such bearing checks with the ship's observation. In accordance with the above the following procedure should be followed by ships desiring to get their bearing from the radio station, North Truro:

A ship will call by radio the radio station, North Truro, whose call letters are N A E, and request her bearing. North Truro will acknowledge and request the ship to send long dashes for five minutes on 600-meter wave length. North Truro will record the ship's direction on the direction finder and report same to the ship. North Truro being on the point of Cape Cod, a ship may be on the other side of the cape for the same setting of the direction finder. The ship will therefore be given the two possible angles from true north, the decision being left to the ship as to which is her correct bearing. The position of the radio station, North Truro, is lat. 42° 02′ 28″ N., lon. 70° 03′ 38″ W. The report sent to the ship will read, for example, as follows:

Position true—N. 120° W., and N. 60° E., from lat. 42° 02′ 28″ N., and lon. 70° 03′ 38″ W.—these being the possible true bearings of the ship from the radio station.

For the present tests should only be made within a radius of 100 miles of the radio station.—*Hydrographic Bulletin*, 24/5.

SUBMARINE MINES—CAUTION.—Information received from the American Ambassador at London, under date of May 2, 1916, through the courtesy of the Department of State, is as follows:

"It has been found necessary to extend the eastern limit of the danger area of the British mine field off the Belgian coast so as to include the waters south of lat. 51° 40′ N. as far as the meridian of 3° 20′ E.

"The mine field as previously reported on October 2, 1915, extended from lat. 51° 15′ N. to lat. 51° 40′ N. and lon. 1° 35′ E. to lon. 3° E."—*Hydrographic Bulletin*.

INTERNATIONAL ICE OBSERVATION AND ICE PATROL SERVICE.—For the purpose of carrying on the International Ice Observation and Ice Patrol Service provided for by the International Convention for the Safety of Life at Sea, London, 1913-14, the U. S. Coast Guard cutters *Seneca* and *Tampa* (formerly named *Miami*) have been detailed for this service.

The object of the Ice Patrol Service is to locate the icebergs and field ice nearest to the trans-Atlantic steamship lane. It will be the duty of patrol vessels to determine the southerly, easterly, and westerly limits of the ice, and to keep in touch with these fields as they move to the southward, in order that radio messages may be sent out daily, giving the whereabouts of the ice, particularly the ice that may be in the immediate vicinity of the regular trans-Atlantic steamer lane.

The *Seneca*, which has been performing Ice Observation and Ice Patrol Service since February 19, 1916, left Halifax April 5 on ice patrol duty; and during the months of April, May, and June, and as much longer as necessary, these two vessels will alternate on patrol, making alternate cruises of about 15 days in the ice region; the 15 days to be exclusive of time occupied in going to and from Halifax. The movements of the vessels will be so regulated that on the 15th day after reaching the ice region the vessel on patrol will be relieved by the second vessel if possible, at which time the first vessel will proceed to Halifax, replenish her coal supply, and return in time to relieve the other vessel at the end of the latter's 15-day cruise. It is important that the patrol be continuous, and the vessel on patrol will not leave her station until relieved by the other vessel unless it is absolutely necessary to do so.

Having located the ice, the patrol vessel will send the following daily radiograms. All time in radiograms will be in 75th meridian time.

(*a*) At 6 p. m. (75th meridian time) ice information will be sent broadcast for the benefit of vessels, using 600-meter wave length. This message will be sent three times with an interval of two minutes between each.

(*b*) At 6.15 p. m. (75th meridian time) the same information will be sent broadcast three times in similar manner, using 300-meter wave length.

(*c*) At 4 a. m. (75th meridian time) a radiogram will be sent to the Branch Hydrographic Office, New York City, through the nearest land radio stations, defining the ice danger zone, its southern limits, or other definite ice news. The telegraphic address of the Branch Hydrographic Office is "Hydrographic, New York."

(*d*) Ice information will be given at any time to any ship with which the patrol vessel can communicate.

Ice information will be given in as plain concise English as practicable, and will state in the following order:

(*a*) Ice (berg or field).
(*b*) Date.
(*c*) Time (75th meridian time).
(*d*) Latitude.
(*e*) Longitude.
(*f*) Other data as may be necessary.

While on this duty, the patrol vessel will endeavor by means of daily radio messages to keep ships at sea advised of the limits of the ice fields, etc. —*Hydrographic Bulletin*, 17/5.

TO PREVENT SEA COLLISIONS.—At a meeting of the board of the Marconi Company to-day Godfrey Isaacs said that Mr. Marconi authorized him to announce that in the very near future he would introduce a new, independent and very simple apparatus to be worked from the bridge of a ship which would put an end to all danger of collision in darkness or fog.

There was little doubt, he added, that every sea-going vessel would be equipped with the invention.—*N. Y. Times*, 15/6.

ORDNANCE AND GUNNERY

SIXTEEN-INCH GUNS FOR NEW BATTLESHIPS.—After a spirited debate of a year or more the United States Navy has decided to adopt 16-inch guns for the new battleships *California* and *Tennessee*. In place of twelve 14-inch guns, carried by the *Pennsylvania* class, the new battleships will mount eight 16-inch guns.

The change was recommended by the Navy General Board a few days ago and was approved by Mr. Daniels, Secretary of the Navy.

It is true that naval officers were by no means united in their views concerning the wisdom of the change. One school of officers, with representatives on the General Board and holding influential posts in the Navy Department, contended strongly for a continuance of the 14-inch guns.

The Value of 16-Inch Guns.—The superior value of the 16-inch gun lies in its power to pierce armor plate at a greater range. The 14-inch gun serves for this up to about 15,000 yards; the 16-inch gun up to about 17,000 yards. Thus below that range both guns are equally effective in piercing armor and beyond the 17,000 yard range the two guns again are on a parity, for neither of them is effective in that respect. The 16-inch gun has the advantage while the range is held at between 15,000 and 17,000 yards.

It was the contention of the officers favoring the 14-inch gun that the loss of four guns necessitated by a change to the 16-inch type was not counterbalanced by the advantages to be obtained in a battle fought at the extreme 15,000 to 17,000 yard range.

Twelve 14-inch guns afford a superior volume of fire, and at a range of less than 15,000 yards twelve of these guns are held to be more effective than eight of the larger caliber. These officers believe that the vital naval engagements will be fought at a range where the 14-inch gun will be completely effective.

Fear of Being Outranged.—On the other hand, those advocating the 16-inch gun held that the United States Navy could not afford to take a chance on having its dreadnoughts underranged, for in that case an enemy with greater speed might hold a range where his shells would pierce the armor plate of the American battleships, whose 14-inch guns would be useless. This theory, of course, presumes the ability of naval gunners to direct effective fire at ranges of 15,000 to 17,000 yards.

The newest types of British battleships and battle cruisers mount 15-inch guns; hence the United States is to surpass these biggest of guns.

Officers of the Ordnance Bureau of the Navy Department have already developed and tested a 16-inch gun at Indian Head. Thus the Bureau of Ordnance is ready for the change and it will not necessitate any delay in the commissioning of the *California* and *Tennessee.—New York Herald, 2/7.*

TORPEDO-TUBES IN LARGE WARSHIPS.—An editorial in *The Engineer* of May 26, 1916, opposes the retention of torpedo-tubes on all large warships. After covering the history of the torpedo-tube and giving details of the installations in all navies, the article recalls that in 1903 the U. S. Navy Department decided to abandon tubes in future construction, the *Connecticut, Virginia, Washington* and *Colorado* class being the ones immediately affected, but an increase in the range and efficiency of torpedoes caused the department to recede from its decision. Having related the incidents connected with the failure of torpedoes to produce decided results in any of the late naval wars, including the present one, the author states that the gun range has again passed the accurate torpedo range and concludes:

When it is remembered that a saving in displacement of 5 to 7 per cent could be effected if torpedo-tubes were omitted, the discussion as to the necessity or otherwise of including this equipment in large armored ships assumes more than academic interest. The number, arrangement, and distribution of submerged tubes are, indeed, factors of great influence in determining the design of such vessels. A notable case in point is furnished by the Japanese battle cruiser *Kongo*. This vessel has eight broadside tubes, to accommodate which four large submerged compartments, some as much as 24 feet in length, had to be provided, owing to the great size of the latest torpedo. As only torpedo equipment can be accommodated

in these flats, a large amount of internal space is necessarily wasted. In the case of a vessel originally designed to have no tubes, the addition of eight tubes with torpedoes and gear, equivalent to a total weight of 90 tons, would mean an increase in length of at least 50 feet, involving in turn an increase of 1800 tons in the displacement of the ship, due to the extra weight of the torpedo equipment, added length, and increased power needed to obtain the same speed. It will be seen, therefore, that the fitting of torpedo-tubes to a large man-of-war adds considerably to the displacement and, consequently to the first cost; but whether there is a corresponding addition to the actual fighting power of the ship seems more than doubtful. All the arguments that 13 years ago temporarily decided the United States naval authorities to abandon this feature of the equipment apply with much greater force to-day. A good case might have been made for the retention of the torpedo when the normal battle range did not exceed two and a half miles; but in actual fact it has risen to more than double this distance. In the Falklands action Admiral Sturdee's battle cruisers opened fire at 13,500 yards, and apparently at no time did the range fall below 10,000, yet both the *Scharnhorst* and the *Gneisenau* were virtually shot to pieces. These distances were much exceeded in the running fight on the Dogger Bank, when the British battle cruisers began to score hits at 18,000 yards and the *Blücher* was disabled by 13.5-inch shells fired at 16,000 yards. With the still heavier and more powerful guns which now form the armament of the latest British and foreign capital ships, battle ranges are more likely to extend than otherwise. Hence as things are it is clear that there is no place in modern tactics for the employment of the torpedo by ships of the line, and whilst the torpedo may still fill an important *rôle* in fleet actions, through the agency of destroyers, submarines ,and possibly light cruisers, the conclusion seems irresistible that torpedo equipment in capital ships is an anachronism.

ENGINEERING

ELECTRIC SHIP PROGRESS.—The "cranks" who first suggested applying electric transmission to ships can seek consolation in the knowledge that despite the adverse criticism of certain experts, practical results are now not by any means negligible. The fact that the United States Navy is electrically equipping three super-dreadnoughts proves, if proof is necessary, that there is something in the idea, and we may add to this the recent news that 21 ships are being fitted with the Ljungström turbo-electric system. For the pioneer work British engineers claim the credit, although the first practical example of the turbo-electric system was on the United States collier *Jupiter*, of 20,000 tons displacement and 12,000 tons deadweight. The economy of this vessel, notably at low speeds, led the United States naval authorities to equip three new super-dreadnoughts. But there is, of course, a vast difference between these vessels and those which are being fitted with the Ljungström system. These latter ships have an aggregate shaft horse-power of 32,000 and vary from ocean-going vessels to river steamers. As they are not yet finished, results cannot be discussed. The system, however, has been installed on the merchant ship *Mjölner*, of 900 shaft horse-power, which began to run in December, 1914, on coasting trade routes in Swedish waters. Careful tests, extending over a period of four months, are claimed to show that the economy of the *Mjölner* is 38 per cent better than that of a corresponding reciprocating-engined ship, this economy being measured by comparing the nautical miles run per ton of coal burnt by the two ships over the stated period.

The Ljungström system as applied to the *Mjölner* is not wholly electric, for the motors transmit their power to the propeller shaft through mechanical gears, with the result that there is an exceptionally large speed reduction. For the average run of merchant ships the direct-coupled turbine drive is not suitable on account of the low speed of rotation necessary for

efficient propellers. For travelling speeds of from 10 to 13 knots the most suitable propeller speeds are from 60 to 80 revolutions per minute, and as the horse-power required to drive these ships varies from 1000 to 3000, according to the speed and dimensions of the hull, the best speed for turbines—or, at any rate, Ljungström turbines—as proved by experience, are 4000 or 3000 revolutions per minute. For the best results, therefore, a 50 to 1 reduction ratio is needed. It was to meet such conditions that the Ljungström transmission system was designed, the originators recognizing perfectly that for torpedo-boat destroyers or express Channel steamers, where the propeller speed is relatively high and the total shaft horse-power relatively large in comparison with the displacement of the vessel, mechanical or hydraulic reduction in some form or another still offers advantage over any system of electric propulsion. The reduction ratio of the *Mjölner* is 80, the turbine speed at 10 knots being 7200 and that of the propeller 90. This ratio is in some measure due to the size of the installation, larger equipments having a ratio of 50 to 1. For driving the merchant ship *Mjölner* two Ljungström turbines are provided, each driving three-phase generators which supply current to two induction motors geared by double helical pinions to a common gear wheel mounted upon the propeller shaft. The mechanical and electrical gear ratios are 10 and 8 to 1 respectively, giving a total reduction of 80 to 1 between the turbines and propeller shafts. On merchant ships, such as the *Mjölner,* it is unnecessary to complicate the electrical gear by the provision of pole-changing arrangements. To travel at half speed one of the turbines is run at half its normal number of revolutions, and between three-quarters and full speed both sets are worked in parallel at speeds corresponding to requirements. Hence, the turbines work under at least as efficient conditions and with the same elasticity as in the case of ordinary geared turbines controlled by a throttle valve or nozzles. With battleships the conditions are altogether different. To enable these vessels to travel at cruising speeds for prolonged periods, pole-changing motors are no doubt advantageous. But on all ships the speed must be reduced to zero when it is desired to reverse. This can be done conveniently by inserting resistance in the rotor circuits, for the duration of running under these conditions is insignificant, and the loss involved of no account whatever. The control of the *Mjölner* is affected by a simple rectangular switchbox, within which all the gear, including liquid resistances, is placed. By turning a hand wheel cones are lifted out of the liquid resistance and the motors then come to rest. The stator leads are then reversed, and the cones again lowered into the liquid, when the motors run in the opposite direction, the total time taken to reverse from full speed ahead to full speed astern being on an average fifteen seconds.

The idea that always strikes marine engineers when confronted with this proposition of applying electric transmission to ships is that the system is complicated and costly. In the present case there appears at first sight good reasons for this belief, seeing that both mechanical and electrical transmission is involved. Upon the other hand, it is to be remembered that the high turbine speed results in small and light power units and a marked gain in fuel economy. That ships equipped with this gear are more costly than those fitted with orthodox power plants the makers do not deny, but the increase is said only to amount to 7 or 8 per cent, depending upon the class of vessel, and a saving of 35 to 40 per cent of fuel, is claimed.—*The Engineer,* 2/6.

THE MOTOR SHIP OREGON.—The motor ship Oregon, built for Det Forenede Dampskibselskab (the United Steamship Company), of Copenhagen, carried out her official trials in Copenhagen Sound on the 15th and 17th of April. During the trials on the 15th there were progressive runs over the measured mile, while in the trial on the 17th the fuel consumption was measured during a three hours' consumption test. The consumption was found to be 0.142 kilos. (say, .303 lb.) of ordinary Borneo crude oil

per horse-power hour. The speed was 12.49 knots, with 2900 indicated horse-power and with the engines running at 148 revolutions per minute.

The main engines of the Oregon are six-cylinder four-stroke single-acting Diesel engines, with a cylinder diameter of 590 mm. and a stroke of 900 mm., and are calculated to develop at normal rating 2800 indicated horse-power at 140 revolutions per minute. Each engine drives its own main compressor, the latter being of Messrs. Burmeister and Wain's standard three-stage marine type. For driving the auxiliary machinery there are three dynamos, each driven by a four-stroke single-acting two-cylinder Diesel engine. These engines are enclosed and fitted with forced lubrication, as are the main engines, and each has its own air compressor and pump for forced lubrication, so that they are totally separate from the main engines, only the cooling water being taken from the common cooling water system. Each of these engines develops normally 75 brake horse-power at 325 revolutions per minute, and is directly coupled to a dynamo with a normal capacity of 50 kilowatts at 220 volts. According to the firm's general arrangement, these engines are of such a size that one of them can take the whole load for working all the auxiliary machinery for normal running at sea. Usually, however, one set is laid off while the two others are kept running, and one engine alone could take the whole load if the other engine had from any cause to be stopped. When in port two of the engines are sufficient for working all the electric winches, so that one of the engines is always in reserve.

The auxiliary machinery consists of two sets of electrically driven pumps for the forced lubrication, two sets of electrically driven centrifugal cooling water pumps, one daily supply pump for pumping up the fuel oil from the bottom tank to the settling tanks, two sets of bilge and sanitary pumps, one electrically driven ballast pump, and an electrically driven auxiliary air pump of such a size that it, in connection with one of the main air pumps, is able to give the necessary air for full load on both the main engines if one of the main air pumps is put out of work. All the dynamos and motors are wound for 220 volts, but for lighting purposes a pressure of 110 volts is used. The steering gear, the winches and the anchor windlass are all electrically driven.

For heating purposes there is a small boiler, and in connection with this a small auxiliary compressor for filling up one of the compressed air bottles should all the air be exhausted.—*The Engineer*, 2/6.

BOILERS OF FRENCH DREADNOUGHTS.—A further subject for congratulation is that the four quadruple-turret cuirasses have been fitted with small-tube boilers of the Normand, Guyot, Belleville, and Niclausse types, especially studied with a view to high rate of combustion (up to 225 kilos per square meter of grate), and to adaptability to military requirements in the matter of smokelessness and sudden changes of speed. Mediterranean experience, it will be remembered, proved rather unfavorable, in these respects, to the large-tube Niclausses and Bellevilles, which it has too long been the fashion to exclusively fit in our large ships.—*Naval and Military Record*, 7/6.

THE DIESEL ENGINE IN THE BRITISH NAVY.—At the recent spring meeting of the Institution of Naval Architects, Engineer Lieut. Commander W. P. Sillince (retired) read a paper entitled, "A Brief Summary of the Present Position of the Marine Diesel Engine and Its Possibilities." The paper well repays study. The writer was compelled to admit that, with few exceptions, the process of evolution and development of the marine Diesel engine has been carried out entirely on the continent, adding that it was there that the largest experience had been gained and most progress made to the detriment of progress in this country. For this reason naval officers generally may be recommended to obtain and study the report of this paper and the informing discussion to which it gave rise. At the same time, this

officer was able to show that the Diesel engine has already exercised considerable influence on the British Navy. He could not, of course, state the number of vessels in the navy equipped with such engines or furnish more than the scantiest information about the engines themselves. His statements, however, were sufficiently specific to indicate what has already been done. There have been constructed and set to work some hundreds of such engines, aggregating over 50,000 b. h. p., the powers per shaft being generally slightly under 1000 b. h. p., and the powers per cylinder varying from 100 to 150 b. h. p. The speeds of rotation vary from 350 to 500 revolutions per minute. In a few instances the power is as high as 1500 b. h. p. per shaft, the power per cylinder varying from 125 to 250 b. h. p. "It is also known that in the summer of 1914 certain engines of submarine type, designed to develop 2500 b. h. p. per shaft, or over 300 b. h. p. per cylinder, were nearing completion, and they are now doubtless on service." Quite recently an experimental single-cylinder submarine type engine, this officer added, was tested on shore, and developed rather more than 500 b. h. p. at about 350 revolutions per minute. The reliability was said to be extremely good, as determined by a shop test of considerable duration, as was also the fuel economy. An 8-cylinder engine made up of such units would therefore give about 4000 b. h. p. per shaft, which exceeds the power per shaft of the largest mercantile engine at present built and installed. Vague, and necessarily vague, as these figures are, they point to a very considerable development in the use of the Diesel engine in the fleet. That the new type of engine is not without its troubles Lieut. Commander Sillince admitted, but he believes that the Diesel engine has a future of considerable importance. He dismissed the light cruiser and destroyer as unsuited to such an installation, but apparently thinks it not improbable that it will be adapted to battleships, with a great increase in radius of action—threefold or more. But he instanced the submarine as the ideal field for the use of the Diesel engine, and looks forward to increasing employment in fleet auxiliaries.—*Naval and Military Gazette*, 17/5.

SUBMARINES

"U-35's" VISIT TO CARTAGENA—A PREDICTION.—The mysterious visit of the German submarine *U-35* to the Spanish port of Cartagena recently is described by the Madrid correspondent to *Lloyd's Weekly News* as having as its object the delivery of an autograph letter from the Kaiser to King Alfonso, conveying proposals for peace.

The correspondent also sends an unconfirmed report that another U-boat is on the way to New York with "a peace letter" for President Wilson.

"It was on Wednesday at 4 a. m. that the German submarine *U-35*, showing no lights and without making her presence known to the port authorities, crept into the Cartagena Harbor. She made straight for the German steamer *Roma*, which had been lying at anchor, interned, since the war began. After a brief parley she handed over to the *Roma* 35 boxes of medical stores and similar goods sent by the German Government for German soldiers interned in Spain from the *Kameruns*.

"When the port commandant heard of the *U-35*'s presence the Spanish cruiser *Cataluna* was sent to order the U-boat to leave the *Roma* and come alongside the cruiser. The command was obeyed. Salutes were exchanged between the U-boat, the cruiser, and the port batteries, and the firing soon brought a crowd to the quays, small boats putting off to visit the submarine, which was soon surrounded.

"The German Consul, his wife, and one of the officers landed and visited the authorities. Later the crew disembarked and toured the town. They told the people they had come from Pola, and while on the journey had sunk several French, Russian and Italian boats.

"At 11 p. m. there arrived a special train from Madrid, bringing the German Ambassador's Secretary, his wife, and the Naval Attaché. News

of the U-boat's arrival bearing an autograph letter from the Kaiser to the King of Spain on the subject of peace proposals had reached Madrid at 10 o'clock that morning and the special was chartered at a cost of $1300.

"They at once went on board the submarine. A long conference ensued and the Kaiser's letter was delivered to the Ambassador's Secretary.

"The submarine left port at 3.15 the next morning with green lights burning. It was accompanied to the limit of territorial water by a Spanish torpedo-boat and the cruiser *Cataluna*. A huge crowd watched the departure. Far out at sea lights were faintly discernible which were thought to be those of the Allies' ships waiting for the U-boat. Just before reaching the Spanish sea limit, the Germans gave cheers for the Spanish boats and dived."—*New York Times*, 25/6.

THE GERMAN MERCHANT SUBMARINE "DEUTSCHLAND."—The truth of rumors that had freely circulated for weeks was borne out by the entry of the merchant submarine *Deutschland* to the port of Baltimore on July 10, with a cargo of dyestuffs and scrap iron ballast aggregating 750 tons.

Quoted statements from the *Deutschland's* commander, Paul König, published in the *Washington Star* cover generally the inception, details, and object of the vessel and its first voyage.

(From Prepared Statement by Captain König)

"The submarine *Deutschland*, which I have the honor to command, is the first of several submarines, built to order of the Deutsche Ozean-Rhederei G. M. B. H., Bremen. She will be followed by the *Bremen* shortly.

"The idea of the building of this submarine emanated of Mr. Alfred Lohmann, then president of the Bremen Chamber of Commerce. He brought his idea in the fall of last year confidentially before a small circle of friends, and the idea was taken up at once. A company was formed under the name of 'Deutsche Ozean-Rhederei G. M. B. H.,' and the Germaniawerft, Kiel, was intrusted with the building of the submarine.

* * * *

Captain König's own story of the *Deutschland's* voyage across the ocean was told to newspaper correspondents soon after he made public his prepared statement. He laughed at stories of his being chased far off his course by enemy vessels, and declared that during the entire trip the vessel traveled submerged only about 90 miles.

"'I have seen," said the captain, "statements that we were forced to go hundreds of miles out of our course in the Atlantic because of British warships. That is not so. Why should we go out of our course, except to submerge? That is the simplest and most effective way to get out of our course. Besides it is much easier to submerge.

"We came to Hampton Roads by the straight course from the English Channel. We did not come by way of the Azores. Altogether from Helgoland to Baltimore we covered 3800 miles. Of that distance 90 miles were driven under the surface of the water.

"Throughout the entire trip the officers and crew were in excellent health and spirits. Of course, when we were under water for long spells the air got very stuffy sometimes, and there was some inconvenience, but it never was serious. The *Deutschland* is built to stay under water for four consecutive days, so you see we never reached anywhere near our submersion limit on this voyage.

"The ship is much easier to ride in than a torpedo-boat destroyer; much steadier. Nothing can happen to her, she is so perfectly built. Of course, she rolls a little at times, but that is no hardship.

"Any nation that can build a ship like the *Deutschland* can do what we did.

"There is little to tell of the trip," he continued. "We left Helgoland June 23 and steamed on the surface into the North Sea. Before sailing we

conducted trial trips and drills for the crew for ten days or two weeks, having proceeded from Bremen to our starting point. I had never been on a submarine voyage and all the training I had was received in the practice trips on the *Deutschland*.

"Everything went without incident the first day, but on the second day in the North Sea we were in the zone of the British cruisers and destroyers. We sighted their smoke frequently, but only dived when we thought there was danger of our being detected. Of course, we were difficult to see because we were running so low in the water and gave out no smoke. We did submerge several times in the North Sea, staying under sometimes two hours and sometimes less. Every time we came to the surface, if all looked well, we kept on going. We saw no British battleships in the North Sea, only cruisers and destroyers, or at least what we took to be British naval vessels.

"We did not on the entire trip come into close proximity with any man-of-war. We avoided them all. It was very simple.

"From the North Sea we went straight through the English Channel, which is alive with warships, and on the night of the fourth day we submerged and remained still all night on the ground on the bottom of the channel. There were lots of cruisers near us, we knew, and it was very foggy. So we thought it wise not to take any chances, and I gave the order to submerge for the night and until there should be clearer weather. The next morning all was well, and we proceeded through the channel into the Atlantic Ocean without incident.

"Our trip has demonstrated that the big merchant submarine is practical, and that it has come to stay. We expect the venture to be a great financial success. This ship can carry a cargo of 1000 tons, and on this trip carried 750 tons of dyestuffs, valued at $1,000,000. The charges for the shipment alone will pay for the cost of the *Deutschland*, about $500,000. On this trip we carried no mails, nor did we carry money or securities. Also we came without insurance, running entirely at our own risk.

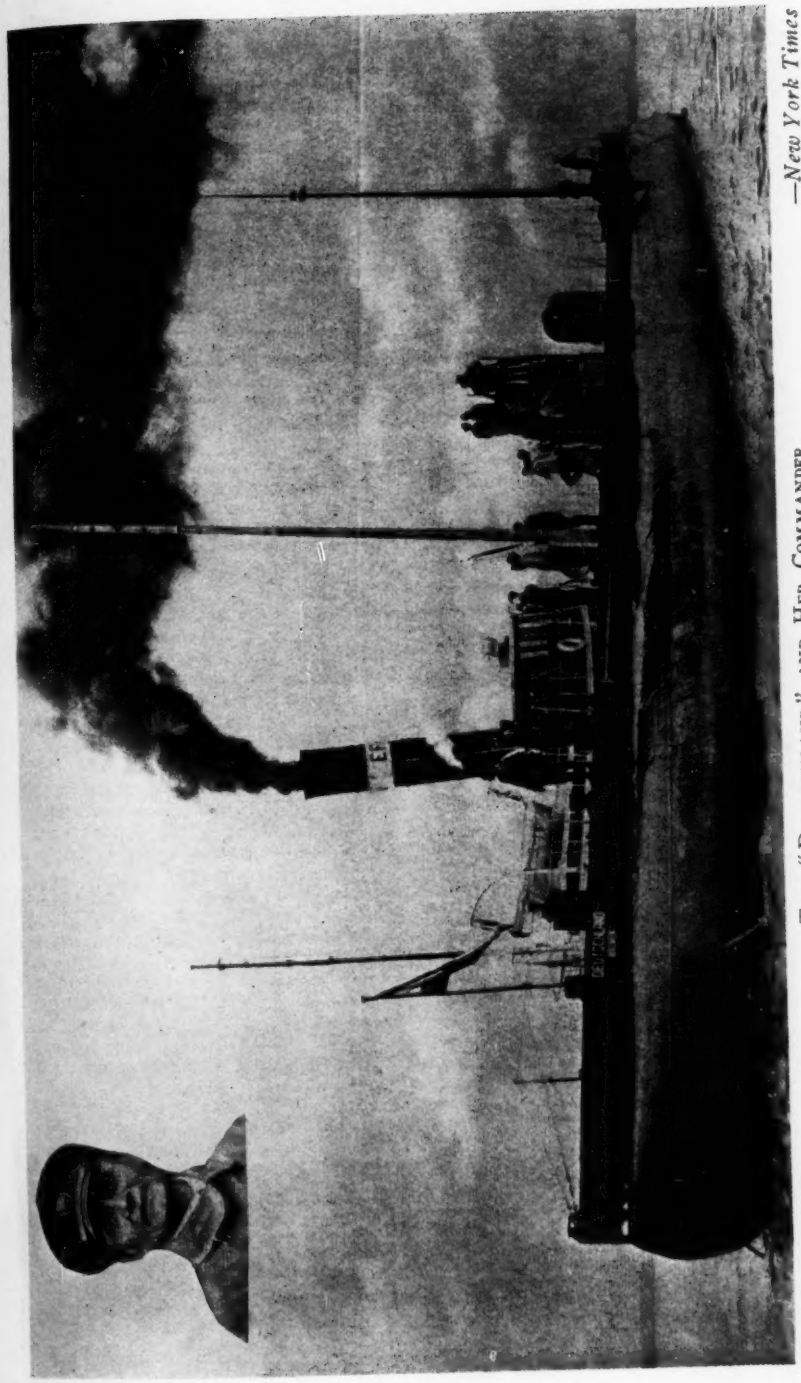
"We will go back again, carrying whatever cargo there is for us to take. And we can go without taking on any oil here. We have enough left to take us home. And I want to say that it will be just as easy to go back as it was to come over. We will have no difficulty getting out of the capes, that is, if British warships do not break neutrality and come within the three-mile limit to attack us. How soon we shall leave I do not know, but we will be ready as soon as we get a cargo."

Built to Submerge 300 Feet.—Captain König said that the *Deutschland* was built for submersion to a depth of 300 feet, but that it was seldom necessary to go more than 50 feet below the surface.—*Washington Star*, 10/7.

The *Deutschland* was inspected by the collector of customs on the date of entry and declared in all respects a merchant vessel, carrying no armament and being incapable of conversion into a war vessel without extensive structural changes. A complete matériel inspection by Captain C. T. Hughes, U. S. Navy, was made on June 11, and the report of the collector was confirmed. Further reports though not at all specific as to details give the general characteristics of this vessel.

The submarine *Deutschland* is 315 feet long and of 30 feet beam. She is built along racing lines, with a sharp outwater and a gracefully rounded elliptical stern, designed to offer as little resistance under headway as possible. Her gunmetal finish gives her a formidable look. She draws awash from 15 to 17 feet of water, and when not submerged her bridge stands about 25 feet above the water line.

She is driven by twin six-cylinder marine Diesel heavy oil-burning engines, each developing 500 horse-power. She carries four officers and 25 men. Her speed on the surface is 14 knots and slightly less than half if submerged.



THE "DEUTSCHLAND" AND HER COMMANDER

—*New York Times*

The machinery of the vessel is amidships, between two storage tanks and between two long freight compartments. Two gangway passages run fore and aft below deck. The conning tower is almost directly amidships. On deck she carries two folding masts that fit snugly in grooves on the deck when not in use. One of the masts, which when straightened aloft is about 100 feet tall, carries a crow's nest. The portable wireless aerials, which were dismantled as soon as the boat reached her slip, are strung between these masts.

* * * *

Captain König swore to the ship's manifest, which showed that her gross tonnage (by measurement allowing one ton to each hundred cubic feet) was 791 tons and her net tonnage 447 tons. She carried, the manifest showed, 3042 cases of dyestuffs, the value and exact weight of which were not given. In addition there were aboard 300 tons of scrap iron ballast. There was nothing in the official papers to show the exact value of the cargo or its precise nature.—*New York Times*, 11/7.

Though the secrecy with which the Germans have surrounded the *Deutschland* suggests that some startling new principle in submarine construction has been applied in her building it must be said that there is nothing startlingly new about the boat. An American naval constructor probably could design such a submersible with equally good chances of successful operation from the present knowledge of submarine design possessed in the American Navy.

The *Deutschland* has two hulls. In order to obtain the greatest strength to resist high pressure when these boats are submerged, it is necessary to build the principal hull almost perfectly round. But a vessel with such lines is never a fast boat. To obtain speed and the strength against pressure the Germans built the *Deutschland* with two hulls. The inner hull is perfectly round and very strong. The outer hull is lighter and so shaped that it gives the *Deutschland* the best possible lines for speed. By means of inlets from the outer hull to the inner hull, the pressure of the water when the boat is submerged is brought chiefly against this inner hull. Instead of building the outer hull as a single sheet of metal and perforating it to let the water enter to the inner hull, thus flooding the entire space between the inner and outer hull, the Germans have built her outer hull after the manner of a waffle iron. This admits the pressure to the inner hull and yet allows the use of much space between the inner and outer hull for storage purpose. In this space are fuel oil and part of the cargo.

In the ordinary cruiser it is necessary to have a round nose or bow, as the torpedo tubes are carried here, in order to get a better direction of fire. But this being not necessary in the *Deutschland* her bow is brought to a sharp point. This again greatly improves her lines and speed. Ordinarily, if built only for speed, the *Deutschland* could probably do better than other submersibles because of her better lines. But high speed means more space used for engines. Economy of space controlled the design of the *Deutschland*. In her case her superior speed lines merely mean that with less engine power and hence less space given to that she makes good speed for a submarine—14 knots, it is said.

INTERIOR DESIGN.—Within the circular inner hull is the main cargo space, the men's quarters and engine-rooms. The living quarters and engines are contained in a long box-like room, hung from the top of the inner hull and run from the bow to the stern. All of the space within the inner hull outside of this room is used for the cargo.

* * * *

The engines are ordinary internal combustion Diesel oil engines. The machinery of the *Deutschland*, the steering and operating machinery forward and the engines, is so complicated that a description of it is impracticable.—*New York Herald*, 15/7.

Little is published concerning means of propulsion when submerged, though all reports agree that the usual system of storage batteries and motors is used without innovations.

MINE SWEEPING.—Under the caption, "The U-Boat Catchers," there appears in the June issue of *The Naval and Military Record of London* an article in which the writer describes a visit to the trawler arm of the Grand fleet. This division of the fleet is least heard from, yet it has perhaps one of the most important tasks of British fighting ships. Not only does this arm watch for submarines, but to it is also, to a great extent, intrusted the important duty of mining and mine sweeping.

"The mine has come to play a greater part in the present struggle than was ever anticipated before the outbreak of hostilities. Germany's surreptitious mine laying started on the first day of war, and from that day an ever-growing system of mine sweeping has been in process of development around our coasts. To-day, in mine sweepers, mine layers, and anti-submarine craft of all descriptions, we have a subsidiary fleet of amazing dimensions. The efficiency of this department of the naval service is most striking. * * * * All ships on the East Coast are kept to a marked channel, and, like the policeman on point duty, the navy regulates and is responsible for the safety of traffic.

"On a certain part of the coast since the outbreak of the war the channel has been used by no fewer than 21,000 ships. Those who have kept to instructions and have been damaged number only three. In the month of March there passed a town on the east coast of England 1537 steamers. Their nationality was determined as follows: British, 1156; neutrals, 381. * * * * Over 800 trawlers and 420 drifters have been fitted out in one port alone, and over 12,000 men have been employed in various branches of the service.

"The mine-sweeping vessels have been responsible for the collection of no fewer than 460 mines."—*New York Times*, 23/6.

THE SUBMARINE CHASE.—How English warfare against submarines has proved successful, owing largely to American-built motor boats, is told in *The Illustrated World* (Chicago, June) by A. M. Rud. Off the Kentish coast, in the English Channel, writes Mr. Rud, is a line of little black dots spaced a hundred yards apart. These are barrel-floats, attached by wire cables to mesh-entanglements below. They are adjusted finely to the water-pressure, so that the moment that a big fish—or a submarine—blunders into the snare, the floats above become submerged. We read further:

"Up and down the line of floats a ceaseless patrol is maintained. Never an instant passes in which a majority of the floats are not under eager observation by alert watchers in the 'fishing-smacks.'

"The smacks are long, low, racing motor boats, built with an eye more to speed than to seaworthiness. A little back of the middle of their lean, 45-foot lengths are the engines, multicylindered affairs delivering from 1200 to 1600 horse-power. This tremendous power gives the 'submarine-killers' * * * * a speed of over 40 miles an hour, sufficient to enable them to outmaneuver any torpedoes which the hunted submarines may launch at them.

"Nor are these wasps without stings. Each carries forward a 6-pound rapid-fire gun—the largest weapon that has even been mounted successfully upon a motor boat. It is just heavy enough to puncture the defensive armor of a submarine, yet so small that it can be handled by two men.

"When one of these fast boats, swirling along the course of the steel-net floats, sights one of the barrels that is acting suspiciously, it swings out around the float in a wide circle. If the barrel stays submerged, the men on the motor craft know that a submarine has become entangled and is struggling to get free. The motor boat plies more slowly in a narrower route, keeping her 6-pounder trained constantly on the spot where the submarine must rise if it gets clear.

"And the submarine must come to the surface if it can, for the lifting power of its air-tanks is practically the only saving strength it possesses once its propeller gets entangled. While the float is under the surface, divers are at work far below, striving desperately to clear away the mess of entanglements.

"If they succeed, the submarine floats free and rises to the surface, to be greeted immediately by a rain of shots from the 6-pounder. One fair hit usually suffices, for submarines, in spite of the tremendous water-pressure they are built to withstand, are fragile creations with respect to defensive-armor equipment.

"If they fail, the submarine's enemies above wait five days. This lapse of time sees every living thing in the submarine asphyxiated. Meantime the motor boat has scooted off to the nearest destroyer, the net is raised at the designated point, and the conquered submarine is towed into port.

"Though it is a fact not widely known, because of the jealousy with which the manufacturers have guarded their secret, these submarine-killers —the wasps of the British Navy—are importations from the United States. Accurate data are next to impossible to obtain, but according to the statement of a British officer whose name cannot be revealed, 50 of these motor boats are shipped daily from American factories to the Allies. The factories are said to be mostly in Detroit, Michigan—but it is hearsay at best." —*Literary Digest*, 24/6.

ABOLITION OF THE PERISCOPE.—It is stated from Holland the Germans have built submarines in which the betraying periscope is entirely done away with. Instead, the new submarine has an arrangement on both sides which answers the same purpose. "There is a lens on both sides in the hull which, in combination with very cleverly arranged mirrors and lenses, enables the look-out to make his observations." It is admitted that this improvement involves the disadvantage that the submarine must be nearer the surface of the water than is the case with the ordinary periscope, but it is said to be more than offset by the considerable advantage of the absence of an object protruding above the water. "A strong light is thrown through the lens-opening at night, which makes it possible to take a view of the vicinity even at night." The writer in question notes in this connection that some of those on board the *Tubantia* thought they saw a light after they had embarked in the boats, but this is hardly reliable evidence in support of the theory. That matter apart, the story is an interesting one. As to the probability of this development in submarine design, only experienced submarine officers can decide. The mere suggestion, however, that the Germans—exceedingly clever in all optical matters—have been able to dispense with the periscope may lead to further research on this side of the North Sea.—*Naval and Military Record*, 26/4.

SUBMARINE'S FEAT.—*300 Miles Voyage with Smashed Bows.*—The Press Bureau on Wednesday issued for publication an article written by Jane Anderson, describing the thrilling experience of a British submarine during a recent voyage on a naval mission. She says:

"In a certain dockyard in England there is to be found a splendid tribute to the prowess of the British submarines, and the skill of those who man them. It is one of the finest of H. M. undersea boats, which, with her bow twisted and bent as the result of collision with an enemy mine in enemy waters, covered a distance of almost 300 miles under her own power, and arrived safely in a home port.

"She struck a mine head on. The explosion smashed two of her bulkheads, broke all the glass aboard her and sent the crew sprawling to the floor of the compartments, but her torpedoes did not explode, her motors did not stop, her dials did not fail to register. She dropped to the bottom of the sea, and water flooded in under the doors of the torpedo tubes. But within 10 minutes of the collision she had been righted, had come to the

surface, and turned her nose towards home. I had heard stories of German submarines sunk by a single shot, and so asked one of the officers how the boat had survived the tremendous shock of a mine explosion.

"'She held because of her strength,' he said. 'It broke her bow and tore off two of her bulkheads, but the last one held. The efficiency of her pumps was not impaired. Within two minutes we had them working. You see, we didn't know what had happened. Water was spurting in, and broken glass was everywhere. We didn't know what was to become of us. We were as far down as we could be, and as for getting up—well, it didn't look to have much of a chance.

"It was fine to see the crew. They got up on their feet and at their stations before the commander had time to order them there. In two minutes the order to rise had gone through to the engine-room, and the pumps were working, but whether we were going to rise or not remained to be seen. It was still enough down there after the explosion. You could hear the motors turning. It's not much of a sound they make, but we were glad enough to hear it, and when we saw the bubble in the clinometer was registering and the inclination was becoming less we knew matters were not as bad as they might have been. We weren't long in getting up.

"At any time there's nothing like coming up into the air and sunlight after you've been under for a bit. But this was different; yes, this was a bit different. We came up. In the silence-room there was the noise of the wireless sparking. The operator was testing it. At any rate, we were floating, so we started looking over her for damage. Things didn't look particularly promising, but it all came to whether we could make port alone or not. We took a look at the bow-plating and at the bulkheads. They looked pretty bad, hanging loose in strips. But we decided we could make it. The engines were right; nothing broken here. The periscope was true. It was only her bow and her rudder that were gone. So we started back. We drove along under our own power. There was a bit of a sea. The waves broke over the bridge and pounded on the one bulkhead we had left forward. 'And so,' he said and smiled, 'we came home.'"—*Naval and Military Record*, 24/5.

AERONAUTICS

In an article on the value of dirigibles, published in the *Rivista Marittima*, May, 1916, Lieut. Commander U. Rossini reaches the following conclusions:

1. The dirigible plays an important part in naval warfare, for purposes of scouting at close and long range.

2. It is adapted to take the offensive against enemy positions, as it is able to attain heights much greater than are possible for aeroplanes.

3. It is probably the best defence against attacks on the part of enemy dirigibles.

4. The type of dirigible best adapted for each of the purposes indicated (with the exception of close-range scouting, where smaller types are sufficient) is that of large dimensions.

5. The type of medium dimensions (which is probably the only type available to the Western Allies in the present war), while it may accomplish fair results in scouting and offensive operations, is of little value for the purpose which is at present of chief importance to Italy—that of defence against enemy aircraft.

THE ARMAMENT OF ZEPPELINS.—The armament of the more recent types of Zeppelins includes, according to the *Rivista Marittima*, six machine-guns, two quick-firing guns, a launching apparatus for aerial torpedoes very similar to a ship's torpedo-launching tube, and various apparatus for dropping bombs. The gondolas are protected by armor which is proof against rifle bullets and also against splinters of anti-aircraft projectiles when fired from a certain distance.—*Engineering*, 5/5.

NEW GERMAN AIRSHIP.—People living along the Swiss border of the Lake of Constance have been greatly surprised over the movements of the new monster airship, much larger than all other Zeppelins, that has been making trial trips over the lake. The length of this ship is said to be 240 yards, or almost double that of other Zeppelins. The cubic contents is even more than double, 54,000 cubic meters instead of 20,000, and the number of the gondolas is four instead of two. These gondolas are said to be armed with guns, machine guns and a new kind of air torpedo.

Despite its huge bulk the ship gives the impression of fishlike slenderness. The steering gear forms an exact cross. The motors are 3000-4000 horsepower, able to give the airship a speed of 90 kilometers an hour. To avoid breakdowns, the motors are in double number. The crew is said to be thirty to forty men. The ship can reach a height of three to four miles.—*Washington Star*, 3/7.

DEFENCE AGAINST ZEPPELINS.—Lord Montagu, speaking at a meeting, mentioned that since the beginning of the war the Royal Naval Air Service had been increased by 40 times and the Royal Flying Corps has also been augmented. These figures within a few months would be very largely exceeded, but the time had arrived when the air service should be capable of independent action, and when both the Royal Naval Air Service and the Royal Flying Corps should be placed under one united control as an Imperial Air Service.

"Zeppelins are becoming more perfect. The one which was wrecked off the coast of Norway the other day, I am informed, had six engines—one more than any Zeppelin had hitherto been known to possess. They are also much longer, and they are carrying a greater supply of fuel, so that, although we were lucky last week in having three destroyed, you must not go away with the idea that Zeppelins are a thing of the past; they are only just beginning."

The following are some of the other points made by Lord Montagu in the course of his speech:

General Pétain, the hero of Verdun, talked the other day of a French aerial force of 50,000 aeroplanes. In my wildest dreams I have never dared to put before even the mildest of Cabinet Ministers any figures of that sort, but I have suggested that we might eventually get into five figures if great energy is displayed and immediate action taken.

The whole way from the coast of Denmark to the coast of Holland the Germans have a constant patrol of rigid airships, able to stop in the air for at least two days, and, I believe, more, able to see over a horizon measured by, say, 70 or 80 miles, instead of seven or eight in the case of a destroyer, and able thereby to inform the German fleet about the movements of our fleet. We have no such rigid airships.

Hitherto there have been 30 raids over this country, and we have only succeeded by our gunfire, both by sea and land, in bringing down three. It cannot be pretended that any of us is satisfied with that result.

The maximum height at which a Zeppelin can come over this country laden with bombs is probably between 6000 and 7000 feet. It might be 8000 feet in certain conditions of weather. But as soon as she has discharged her bombs she can attain a much greater height—probably somewhere about 10,000 feet.

The proper place to stop the Zeppelin is not when it gets over London, but when it leaves Germany. It is then at its lowest point and stuffed with bombs, and if you happen to hit one of the bombs the Zeppelin will be no more.—*London Times*, 10/5.

ZEPPELINS AS SCOUTS.—The Germans have recently illustrated how Zeppelins can co-operate with a fleet. In the recent raid on the Norfolk and Suffolk coast their battle-cruiser squadron, accompanied by light cruisers and destroyers and submarines, was able to cross the North Sea in the darkness without being molested and to return home without encountering

any considerable naval force, because the admiral in command had Zeppelins acting as his scouts. Apparently the air and sea forces left the German coast soon after sunset; the Zeppelins presumably crossed the North Sea at no great height, and were thus able to signal back information to the naval force, which was presumably travelling under easy steam. Four or five Zeppelins were employed, and they all advanced to the English coast. Two of them only penetrated inland, dropping a number of bombs, while the others appear to have acted as guard at sea to the naval force. So far as we are aware, this is the first occasion on which the enemy has definitely employed an air squadron for the purposes of reconnaissance in advance of a naval force.—*Naval and Military Record*, 3/5.

SIX ZEPPELINS THIS YEAR.—The actual number of German airships which have been destroyed since the outbreak of war is not known, but it has been definitely reported that 13 have been wrecked, and that of these the following six have been lost in the present year:

L-19.—Wrecked in the North Sea on February 3.

L-77.—Shot down by French guns in the neighborhood of Brabant-le-Roi, Argonne, on February 21.

L-15.—Hit by gunfire in raid on Eastern Counties and sank off the Thames Estuary on April 1. Crew made prisoners.

L-20.—Wrecked near Stavanger on May 3.

Unnamed vessel.—Destroyed by H. M. S. *Galatea* and *Phaeton* off Schleswig Coast on May 4.

Unnamed vessel.—Brought down by Allied warships at Salonika on May 5.—*London Times.*

AEROPLANES FOR U. S. ARMY.—Twenty aeroplanes were ordered last week by the War Department, according to information received by the Aero Club of America, in addition to the twelve now under construction at Plainfield, N. J. The present order includes eight Martin machines and 12 Sloane-Day biplanes. Two of the Martin machines are seaplanes, equipped with 135 horse-power Hall-Scott motors, and will be sent to the Philippines. The six Martin machines will be sent to San Diego, Cal., and will make a total of fourteen machines for training officers at the army flying school.—*Army and Navy Journal*, 17/6.

THE UNITED STATES AEROPLANE INDUSTRY.—We read in the *Iron Age* that the remarkable growth of the aeroplane industry of the United States is indicated by the exports of 398 aeroplanes for 1915, against 40 in 1914 and 19 in 1913. The value of the 1915 exports was $2,960,814, or an average of $7439 per machine, against the $6337 in 1914 and $3227 in 1913. The exports of aeroplane parts were also very large, amounting to $2,457,782, as compared with only $145,997 in 1914 and $25,606 in 1913. Imports of aeroplanes into the United States decreased from 16 and 13 in the fiscal years of 1912 and 1913 to only one each in the fiscal years of 1914 and 1915.—*Engineering*, 3/6.

STEAM SEAPLANES PLANNED.—Navy Department experiments indicate that steam-driven seaplanes may solve the motor problem of air navigation. Many officers believe that only the question of getting the weight of the steam plant down to the lowest possible figure remains to be answered before a steamer of the air is constructed and tried out.

Experimental work was begun many months ago, and an improvised plant, consisting of a boiler similar to those used in steam automobiles and a compact steam turbine, has been thoroughly tested.

Steam equipment would guarantee constancy of power, upon which aeroplanes depend for stability. Most accidents to aviators, it is pointed out, have been due to failure of motors.

Steam turbines also would provide power far in excess of anything now obtainable with gasoline engines, it is said. This is a vital factor, as seaplanes are much heavier than aeroplanes for land service.—*N. Y. Times*, 6/12.

TABLE SHOWING PROBABLE ZEPPELIN LOSSES FROM AUGUST 1, 1914, TO JULY 15, 1916

No.	Name	Place	Date	Cause of Loss
1	Z-8*	Badonvillers, France	22- 8-1914	Destroyed by French gunners. Part of crew lost.
2	Z-5*	Mlava, Russia	29- 8-1914	Destroyed by Russian gunners. Crew lost.
3	?*	Seradz, Russia	6- 9-1914	Captured, while at anchor, by a cavalry patrol. Crew of 30, prisoners.
4	?	Düsseldorf, Germany	9-10-1914	Destroyed in shed by British aviators.
5	LZ-31*	Friedrichshafen, Germany	21-11-1914	Destroyed in shed by British aviators.
6	?	North Sea	23- 1-1915	Foundered during a storm.
7	L-3*	Esbjerg, Denmark	17- 2-1915	Stranded, having run out of fuel, and broke up. Crew of 16 interned.
8	L-9*	Boulogne, France	5- 3-1915	Foundered during a storm, after having raided Calais. Crew lost.
9	L-8*	Tirlemont, Belgium	4- 3-1915	Damaged by British aviator; wrecked on landing. 21 of crew killed.
10	?	Thielt, Belgium	12- 4-1915	Damaged, over Béthune, by French gunners; wrecked on landing.
11	?*	North Sea	26- 5-1915	Broke away without crew; foundered off Heligoland.
12	LZ-37*	Evere, Belgium	7- 6-1915	Destroyed in shed by British aviators.
13	LZ-38*	Ghent, Belgium	7- 6-1915	Destroyed in mid-air by British aviators: crew lost.
14	L-?*	Ostende, Belgium	10- 8-1915	Raided London. Destroyed, upon her return by British aviators.
15	?*	Vilna, Russia	24- 8-1915	Shot down by Russian gunners; crew of 10 made prisoners.
16	?*	Saint-Hubert, Belgium	13-10-1915	Destroyed by exploding in mid-air.
17	?	Maubeuge, France	16-10-1915	Stranded on a chimney and broke up.
18	?	Grodno, Russia	5-11-1915	Destroyed by the storm on landing.
19	L-18*	Tondern, Germany	17-11-1915	Wrecked in shed through an accidental (explosion).
20	Z-28	Hamburg, Germany	17-11-1915	Wrecked by the storm.
21	L-22*	Tondern, Germany	1-12-1916	Destroyed in shed through accidental explosion of a bomb.
22	?*	Kalkun, Russia	5-12-1916	Shot down by Russian gunners. Crew lost.
23	?*	Mainvault, Belgium	30- 1-1916	Raided Paris. Damaged by French aviator; wrecked on landing.
24	L-19*	North Sea	21- 2-1916	Raided England. Probably run out of fuel; foundered. Crew lost.
25	LZ-77*	Révigny, France	21- 2-1916	Shot down by French motor guns; destroyed in fall. Crew of 15 killed.
26	L-15*	Kentish Knock, England	1- 4-1916	Shot down by British gunners; crew of 18 surrendered. Vessel sank.
27	L-20*	Stavanger, Norway	3- 5-1916	Raided Scotland. Stranded, having run out of fuel and drifted with the wind. Blown up by crew; 3 killed, 16 interned.
28	?*	Off Schleswig coast	4- 5-1916	Shot down by H. M. S. *Galatea* and *Phaeton*.
29	?*	Salonika	5- 5-1916	Shot down by Allied Warships.

* Destruction authenticated.

TEST FOR HYDRO-AEROPLANES.—The navy will soon, for the first time, try them out under test conditions at sea. The experiments will be undertaken this summer during the maneuvers of the Atlantic fleet. Six of the seaplanes are now being put aboard the armored cruiser *North Carolina* at the Pensacola naval aviation station.

The *North Carolina* is fitted with a catapulting device, by means of which hydro-aeroplanes may be launched in the air in any weather, no matter how rough at sea. The device was recently perfected and is said to be in advance

of anything now in use in foreign navies. Heretofore it has been possible to use the aircraft only in good weather.

It is stated that the *North Carolina* will be fitted with a hydrogen generating plant and carry a kite balloon for observation and fire spotting. She will operate as a scout in advance of the fleet and the hydro-aeroplanes will be employed to extend her radius of action.—*N. Y. Herald*, 21/6.

LESSONS OF THE WAR

INFLUENCE OF MODERN CONDITIONS ON DESIGN.—Excepting the French battle fleet, which was compelled, by the twofold lack of scouts and of bases near at hand, to keep at sea months upon months (6000 steaming hours in a year) waiting for the Austrian squadrons to come out, the belligerent battleships have for the most part been confined to harbor since the opening of hostilities, there waiting for the "great day." Under the new conditions of warfare long cruises for ships of the line thus appear to be a thing of the past. This is a very important fact, which is bound to materially influence warship design, especially in France, where greater sacrifices have been made to the comfort of crews than in any other navy, under-gunned armored cruisers like the *Klebers, Gloires, Renan,* etc., being nothing but floating palace hotels, towering some 25 feet above water and offering extensive and vulnerable targets.—*Naval and Military Record*, 24/5.

DEFENCE AGAINST SUBMARINES.—The question of the influence of the submarine era on warship design is being again the subject of an interesting controversy in Paris naval circles, together with fast scouts and flotilla units.

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A category of naval students, contends that the impending revolution in warship design will only be superficial, the mastodon battleship having been shown by recent experiments, as well as by the experience of war, to be easily adaptable to the new conditions of warfare, and to be susceptible of a large degree of immunity against under-water attacks. Of late strides have been made towards a satisfactory solution of the problem of anti-submarine defence. Kites of the Sacconey type, now extensively used on board, and taking observers an altitude of some 500 meters, whence the radius of vision extends over 50 miles in clear weather, together with dirigibles, slow-going seaplanes, and fixed balloons, will do away to a great extent with the invisibility of submarines, which is their strong point. Secondly, outer shells of the Ferrand type, or double nets as recommended by Mons. Bertin, will absorb the force of submarine explosions and preserve the hull from serious injury. Thirdly, longitudinal armored bulkheads, as in *Normandies,* but heavier and more effective, together with elaborate subdivisioning, will minimize the effects of the explosion in the rare cases when it takes place in direct contact with the hull, safeguarding the stability and fighting value of the ship. The larger the displacement, the more efficacious the anti-submarine protection, that ought, it is held, to absorb some 10 per cent of the tonnage instead of 1 or 2 per cent as in recent dreadnoughts. No increase of size necessary if all superfluous superstructures, freeboard, and crew quarters, so noticeable in French battleships, can be suppressed. Such, at least, is the view of our most experienced constructors.—*Naval and Military Record*, 17/5.

URGES A SCRAPPING POLICY.—On the highest national grounds the policy of hanging on to old ships is a mistake, because their presence on the effective list deludes the public, always under peace conditions ready to be misled if thereby the cost of the navy can be kept down. On naval grounds this policy may be described as inhuman. Under superior orders, officers and men are required, with inadequate equipment, to defend the flag probably against superior force, and in so doing they are compelled to expose

themselves to almost certain destruction. Fortunately for our welfare and the welfare of the Empire, the Admiralty at last realized the costliness of the policy of continually repairing old ships, and these dummy vessels were relegated to the scrap-heap. By this action the Admiralty in 1904 contributed to the triumph of the British fleet in 1914. Funds were set free for building new ships, and officers and men, who would otherwise have been in vessels which could neither fight nor run away became available for strengthening the enlarged and efficient squadrons on which in the hour of supreme trial our fortunes depended.

The scrapping policy was of American origin. For many years it had been adopted by business men on the other side of the Atlantic, and was regarded by them as the sheet anchor of American industry. The British naval authorities adopted the principle, but curiously enough the Navy Department of the United States has hitherto failed to follow this lead courageously. The American fleet still includes a large number of ships whose fighting value has long since become a minus quantity.—*Naval and Military Record,* 10/3.

SEA POWER.—The powerlessness of the submarine to interfere with the "safe passage" of well-organized convoys is strikingly illustrated by the recent Admiralty report on the Allied operations in the narrow waters of the Adriatic, which is an ideal field of action for under-water craft, especially when are considered the strategic advantages enjoyed by Austrian bases. From December 17 to February 20 last, some 350 steamers (including steam trawlers) have, under escort of French and Allied warships and within easy reach of Cattaro, transferred from Albania to either Brindisi or Corfu or inversely, no less than 200,000 troops nad 30,000 tons of material, without mentioning provisions and cattle. Against this interminable procession of vessels on so short a sea route, truly exceptional opportunities were offered to the enterprising enemy. Submarines made 19 combined attacks, destroyer flotillas displayed like activity, scattering mines broadcast, and seaplanes did their worst; all this trouble and fuss to bring about the loss of three small steamers, two of which were mined and the other torpedoed. Not a single Serbian soldier lost his life. On the other hand, it has been ascertained that three Austrian submersibles have been sunk, whilst a seaplane was captured off Valona. Thus a creditable achievement on the part of the Allied navies, but also a damaging blow to the prestige of the submarine.

* * * *

Bombardment remains one of the most important operations of sea warfare, though it must be entrusted no longer to battleships, but to specially-designed, shallow-draft, and practically insubmersible monitors, carrying the heaviest ordnance—a problem of naval architecture both the Paris and London Admiralties have satisfactorily solved. This war will have revived in a new form the gardecôtes type on which France has spent so much money and talent, and to so little advantage. The 30-year-old *Requin* of 7800 tons, after successfully testing her modern 10.8-inch guns against the Turks in Egypt, has just been recommissioned by Commander Loizeau for further services in the Levant. And so the monitors of to-morrow, giving up the pretension of being a match for armorclads three times their size, will specialize themselves in the attack on coasts, and only claim to excel in two respects, viz., caliber and range of their very limited armament and relative immunity against underwater explosions. They will embody sacrifices in speed and armor, and be a recognition of the fact that warships are only "compromises," and that "*la perfection absolue,*" in the research of which Gallic *ingénieurs* have expended so much finance and labor, is not to be realized or aimed at in naval construction.—*Naval and Military Record.*

MERCHANT MARINE

AUSTRALIAN GOVERNMENT OWNERSHIP.—In order to provide for the transport of the Australian wheat crop Mr. Hughes has bought 15 steamers to be employed in a State-owned steamship line under the title of the "Commonwealth Government Line." These vessels range in gross tonnage from 3534 to 4454 tons. It is understood that for the larger vessels about £140,000 each has been paid and that the purchase price will run into one or two millions.—*Marine Engineer and Naval Architect*, July, 1916.

A CENSUS OF SEAMEN.—Up to the first of June "able seamen," says the Providence *Journal*, have been certified to the number of 20,678, under the La Follette law requiring such certification after rigid examination for the deck department on American vessels of 100 gross tons or over, except those navigating rivers exclusively or the small inland lakes, and on fishing or whaling vessels, or yachts.

A report of the steamboat inspection service shows the nationalities of these qualified American seamen. The American born number 6302; naturalized, 2165. The remaining 12,000 or so are both of foreign birth and foreign nationality. Included in the native Americans are Hawaiians—first rate sailor material, employed largely on the Pacific side—and Puerto Ricans. Probably, few of the old New England breed are in this census, though there are many of them in our fishing fleet.

The Norwegians, of course, are the most numerous among the alien A B's—2718 of them. Russians or Finns, Swedes, British and Germans follow in order, about 1000 certificates each. But, practically every country on earth is represented. There are 22 Turks, 10 Roumanians and three, severally, Serbians, Montenegrins and Bulgarians. More strange is the showing of Swiss sailors, 39 of them. They perhaps acquired their sea strain from a French or Italian ancestry.—*New York Times.*

MANY SHIPS BUILT HERE.—The Bureau of Navigation of the Department of Commerce announces a large output of ships built in American yards the last year. The total tonnage of new ships is 347,847, and they number 1030. Seaboard yards built 35 large steel merchant steamers aggregating 191,859 gross tons, the largest merchant steel output in their history. Of these, 21 steamers are each over 5000 gross tons, the largest being the steamer *H. H. Rogers*, of 10,050 gross tons, and 14 are between 3000 and 5000 gross tons each.

The Newport News Dry Dock and Shipbuilding Company built six of 40,329 gross; the Maryland Steel Company, at Sparrow's Point, Md., eight of 35,665 gross tons; the Union Iron Works, San Francisco, five of 32,665 gross; the New York Shipbuilding Company, Camden, N. J., seven of 32,164 gross, and the Fore River Shipbuilding Company, Quincy Mass., four of 24,932 gross. The Newport News, Camden, and Quincy yards were also engaged in construction for the United States Navy.

Of steel ocean steamers, 24 of 138,858 gross tons have been registered for foreign trade, and eight of 34,386 gross tons enrolled for the coasting trade. One, the *Pacific*, of 6034 gross tons, was sold to Norwegians.—*New York Times*, 9/7.

ONE HUNDRED AND SEVENTEEN SHIPS AVAILABLE.—Rear Admiral Benson, chief of operations, testifying before the Senate Commerce Committee last night in favor of the administration's government shipping bill, said a canvass of the American merchant marine by naval officers had shown only 117 vessels, including all classes, that could be used as naval auxiliaries in case of war. The navy, he said, would need many more than that number to supply its ordinary needs in emergency, not to mention the demand that would arise for first-class fast craft that could be used as scout cruisers.—*Washington Star*, 23/6.

NEW SHIPBUILDING PLANT.—The newly organized Sun Shipbuilding Co., of Chester, Pa., has let contracts for a dozen buildings and six building berths. It will be able to construct steamships up to 750 feet length. The plant will be one of the most modern in America, and virtually all necessary equipment for the vessels, including boilers and engines, will be made by the Sun Company at Chester. Employment will be given to 2500 men. It is hoped that the first keel will be laid in September. The Philadelphia & Reading Railway is laying sidings on the site of the proposed shipyard.—*Shipping Illustrated*, 20/5.

WAR'S EFFECT ON THE WORLD'S TONNAGE.—The war's toll in merchant vessels during the month of May numbered 57 of all types, having an aggregate gross tonnage of about 116,724 gross tons. This showed a great falling off over the month of April when 90 vessels of 214,880 gross tons were destroyed. Up to June 1st, this year, the total number of vessels destroyed were 12,076 of over 2,585,362 gross tons. This loss is distributed as follows: British Allies: 1,997,216 tons, of which loss Great Britain suffered two-thirds; neutral shipping destroyed 369,176 tons; German Allies 213,243 tons. No ships of the United States, Japan or Belgium were lost during May.—*Marine Journal*, 1/7.

GREAT BRITAIN'S PRESENT STATUS.—We have now some more reliable statistics as to the effect of the submarine war in the past on the British Mercantile Marine. During 1915, 451 vessels of 814,233 tons were lost owing to the war—not all, of course, due to the submarines. This amount of shipping was only a little more than the volume of new tonnage added—438 ships of 778,321 tons. Taking the vessels lost from all causes during 1915, the total is 1075 ships of 1,534,901 tons. As against this, the total additions during the year, including 92 ships purchased from foreign countries, were 807 vessels of 1,523,750 tons. It will be noticed that the ships added were, on the whole, larger than those lost, so that although the numbers were fewer the tonnage was only less by 11,151 tons.—*Army and Navy Gazette*, 13/5.

CUNARD COMPANY EXTENDS SERVICE.—A merger which will extend the sphere of influence of the Cunard Steamship Company to Australia and New Zealand was announced last week in the amalgamation of this with the Commonwealth and Dominion Line, operating about 25 ships. Announcement of this step following so soon after the recent agreement with the Canadian Northern is taken as an indication that the Cunard Company is organizing a powerful control of shipping with which to enter the struggle for world trade following the war. When the present combination is completed, Cunard ships will serve all important trade routes with the exception of the Pacific and South America. In regard to the latter there is a rumor afloat that a combination is pending with the Royal Mail Steam Packet Co., which would add South American and West Indian service.—*Marine Journal*, 3/6.

NEW ITALIAN FREIGHTER.—The new Italian freighter *Milazzo*, with a cargo capacity of 14,000 tons, arrived this week from Genoa. She was built for the Navigazione Generale Italiana Line, and her arrival here was a signal for naval architects to investigate the "Menda" system, under which the construction was carried on.

She will be followed in September by the *Volturno*, sister ship. The big freighter is 512 feet in length, 65.8 feet breadth of beam and 33.8 feet moulded depth. Her displacement, loaded, is 20,040 tons, and with a quadruple expansion engine of 4000 horse-power she makes 11 knots.

Designed for the carrying of coal, grain or bulk cargo, the holds of the *Milazzo* are different from other freighters. On either side of the center of the ship are tunnels, each with two tracks laid, on which small cars travel,

until shafts are reached, where elevators lead to the upper deck, and continue up tall mastlike guides, taking the cars to a height where, when they are emptied, gravity disposes of the cargo to smaller ships alongside or to the pier. The tunnel roofs in the holds are slanting and feed the cargo through small openings to the cars on the tracks. There are 20 of these elevators and shafts on the *Milazzo*. The *Milazzo* has a gross tonnage of 11,477 and a net tonnage of 7537.—*Nautical Gazette*, 20/6.

SEA HABIT ENCOURAGED IN JAPAN.—How Japan is fostering her merchant marine was evidenced recently by the crew of the Japanese freighter *Kunajiri*, which arrived at Seattle with 73 men. This unusually large number was due to the apprentices carried in both deck and fire-room crews. The apprentices are mere boys, but they are being taught the knowledge that in a short time will make practical steamship men of them. This practice is also being followed by other steamship companies in Japan. —*Marine Journal*, 1/7.

RECORD TRANSOCEANIC TOW.—The arrival of the Standard Oil Company's big American tanker *Richmond* at Shanghai with barge No. 95 in tow, after a voyage of 82 days from New York, has aroused interest in marine circles over the feasibility of extending towing services for general cargoes to foreign ports.

The *Richmond's* tow to Shanghai is a record one to date, and the actual distance covered between New York and Shanghai is reported to have been 12,465 miles. The *Richmond* after discharging at Shanghai has left for San Francisco with No. 95 again in tow.

Towing engines are installed on both the towing vessel and the vessel towed, but only one towing engine is put to use at a time.

The form of engine employed is known as a modified Providence gear. The modification effected does away with the excessive chafe which arose in certain well-known makes of towing engines.

In fine weather the towing is done on the brake, and when both vessels are light the steamer takes the hawser from the barge. With both vessels levelled, the steamer gives her hawser to the barge.

Bad Weather Precautions.—In heavy weather both hawsers are used at lengths of 200 fathoms, or a single hawser may be payed out at 250 to 300 fathoms. In actual service one of these standard English 2-inch diameter steel hawsers last usually one year.

A Ford type of towing chock is installed at the stern of the steamer and a similar towing chock is fitted in the bow of the barge. These towing chocks are mounted on ball bearings, the effect being to obviate any tendency to snap the hawser when sharp changes in the courses are made.

In securing the hawsers recourse is had to trap hooks. The hooks are fastened to the decks and the loop of the hawser is passed over the tongue, when the clevis is brought into position to hold the tongue from moving. In case of accident a sharp blow will shear the pin, thus allowing the clevis to release the tongue and the hawser. These tongue bits have a height of 2 feet 9 inches and occupy a fore and aft deck space of 2 feet 1½ inches. The approximate net weight is 500 pounds.

Belts are not used at all in securing the hawsers, as it has been found a too difficult matter to let a line go quickly when made fast to the ordinary type of towing belt.

In heaving in the hawser a 5-inch line from the winch is employed. At each end of the hawser an eye is spliced around a solid cast steel thimble.

The towing chock, as installed, is the saver of the hawser in many instances. The roll which supports and guides the hawser is carried on a pin in a forged yoke, which swings on a pin suspended from the top casting. The lower end of the yoke is provided with a roll. This roll works in a radial groove in the base casting. No matter how the hawser leads, the yoke will swivel so that the hawser will lead fair, from whatever direction

it may be pulling. These towing chocks weigh approximately 1750 pounds and cover an athwartship deck space of 50 inches, a fore and aft deck space of 25½ inches and a height of 33 inches.

The Sag Below Water.—The practice in the deep sea tows is to carry only one turn on the drum of the towing engine. So far as can be learned, the Standard Oil vessels seldom, if ever, find it necessary to let go a line, no matter how bad the weather. An interesting fact was disclosed by one master by actual test—namely, that when 200 fathoms of steel hawser was out the sag below the water surface reached a maximum depth of about 17 fathoms, and that frequently when towing through the Florida Straits the hawser scraped over the ground. This latter fact was made known by the action of the towing engine.

The principle of the towing engine involves a combination of the elastic steam cushion and the automatic relief to the hawser. The latter obviates a continual straining of the line and a consequent tendency to break. The distance between the vessel in tow and the towing ship may be altered at will by means of the towing engines, the advantage of which is apparent in a crooked channel or when passing under bridges. In heavy swells, when a heavy strain is suddenly put on the hawser, the towing engine automatically relieves the line, and when the strain relaxes the engine winds in the hawser. The strain on the hawser can be regulated at will at a fixed pull and automatically the strain is maintained.—*New York Times.*

MISCELLANEOUS

ARMOR TO GOVERNMENT AT COST.—A letter from E. G. Grace, President of the Bethlehem Steel Company on the above subject is quoted:

"The Bethlehem Steel Company will agree, for such period as the government may designate as fully protecting the public interest, to manufacture armor plate for the government of the United States at actual cost of operation plus such charges for overhead expenses, interest and depreciation as the Federal Trade Commission may determine to be fair. * * * *

"The situation, in brief, as we see it, is as follows:

"1. Figures compiled for your committee have shown you that the United States has for the past 20 years obtained armor plate at a price materially less than that paid by any of the great naval powers, while our labor costs were and are higher than those prevailing in any other country.

"2. The Navy Department has repeatedly testified that the quality of armor supplied for these reduced prices was better than the armor made for the navy of any other nation in the world.

"3. The existing prices of materials and labor are very much higher than was the case when the estimate was made that the proposed government plant of 20,000 tons capacity could be built for $11,000,000. Our experience indicates that the cost now would be fully $15,000,000, and probably more.

"4. The naval lessons of the present war remain to be learned. What they shall teach with reference to armor and the relative value of projectiles and armor is still to be seen. Under no conditions can an armor plant be built in less than three years. Thus the problem to be faced in the manufacture of armor may be absolutely different by the time the plant could possibly be ready for use.

"5. The private armor making capacity in this country was brought into existence at the behest of the government. In these three plants some $20,000,000 has been invested. The capacity of these plants is and for many years will continue to be in excess of the requirements of the American Government. These facilities are of value for no other purpose than the making of armor; and the construction and development of a government plant would mean the practical confiscation of these plants and the elimination of reserve capacity might become vitally important in any emergency in national defence. * * * *

"Under the foregoing circumstances, we respectfully ask your committee to reconsider its former recommendation on this subject and to bring to the attention of the Senate these considerations:

"1. That all purposes of the United States Government will be served if the Federal Trade Commission is empowered to determine the price and the Navy Department the quality of the armor which shall be manufactured for the use of the United States Government.

"2. That until under the foregoing conditions, the existing capacity of armor plants built for and at the request of the government is utilized, it will be unfair to private manufacturers for the government to take action which will in effect confiscate their property.

"3. That until the naval lessons of the present war in Europe have been disclosed, and until a practical effort has been made to obtain armor from private manufacturers under the conditions named, the government should not proceed with the expenditure of the public money necessary to construct an armor making plant."—*N. Y. Times*, 21/6.

U. S. NAVY COAL CONTRACTS.—The Navy Department has awarded the contract for Hampton Roads delivery of New River and Pocahontas coals for which bids were opened May 5. The following awards have been made:

	Bid	Awarded
Crozer-Pocahontas Co.	250,000 at $2.58	
Crozer-Pocahontas Co.	150,000 at 2.63¾	150,000 at $2.58
Chesapeake & Ohio Coal & Coke Co.	240,000 at 2.69	240,000 at 2.69
W. C. Atwater & Co.	200,000 at 2.80	200,000 at 2.80
Archibald McNeil & Son	50,000 at 2.84	50,000 at 2.84
C. G. Blake Co.	120,000 at 2.85	75,000 at 2.85
West Virginia Coal Co.	50,000 at 2.85	25,000 at 2.85
Willard, Sutherland & Co.	50,000 at 2.85	10,000 at 2.85

Proposals were asked on 600,000 tons, and awards were made for 750,000 tons. A year ago, awards were made for only 400,000 tons.—*Shipping Illustrated*, 10/6.

NEW NAVAL MESSING SYSTEM.—The paymaster general of the navy is in receipt of an interesting report from Paymaster George R. Venable, of the U. S. S. *New York*, descriptive of a new method of serving food to the general mess installed on board that vessel and destined to be extended to other ships as opportunity is afforded. By the adoption of what may be called the "cafeteria" system on the *New York*, it now takes from six to nine minutes to issue the entire ration to the crew, depending upon the number and nature of the articles served. Paymaster Venable says in his report:

"The question of serving food direct to the individual has been given a certain amount of consideration for a number of years, but the time that must elapse from the time the first man in the line presented himself until the last one was served and the distance some of the men would have to go to reach their tables offered serious obstacles to the scheme. Finally the idea of establishing several substations in different parts of the ship, from which food could be served simultaneously, presented itself and the problem appeared to be solved. Before the ship left New York in January enough 18-inch oval serving trays, extra bowls, and individual butter chips were procured to make it possible to serve about 120 men after the manner in operation in certain quick-service restaurants in New York and which has been adopted in a number of manufacturing plants throughout the country. This service was given a thorough practical test at the locations of the present substations in various parts of the ship for several weeks under personal direction and supervision in order to get the messmen properly trained as it was being developed and give the crew a correct first impression of it. The results appear to have been very gratifying to all parties con-

cerned—in fact, it seems to be a game in which everybody wins, for there is better discipline maintained at meal time; there is less dirt deposited about the ship; less time is required to spread mess gear and clear it up; the food is cleaner, better, and more wholesome, and waste is reduced to a minimum. And all it requires is close attention to every detail for a few weeks at the beginning, until all hands in the commissary department and the petty officers in each part of the ship (who are to take direct charge of each substation) thoroughly understand its operation and appreciate its advantages."—*Army and Navy Register*, 3/6.

MOBILIZING OUR INDUSTRIES.—From the canvass of American industries made by the committee on industrial preparedness of the Naval Consulting Board, a large mass of material is being assembled and tabulated in the offices of the board in the Engineering Societies Building in New York City before being sent to Washington for the benefit of the War and Navy Departments. The field work of this industrial inventory of nearly 100,000 manufacturers is being done by 30,000 engineers in every state, Alaska and the District of Columbia.

The Chamber of Commerce of the United States has begun a movement to help this idea of the mobilizing of the industrial forces of the United States, full credit for which should go to Secretary of the Navy Daniels, who originally suggested the general scheme of mobilization. According to the Chamber of Commerce plan, the leading manufacturers of the country would voluntarily relinquish large profits and marshal their resources for the benefit of the government at the minimum cost. As an illustration of how this scheme works, the Chamber of Commerce points out that after inspection by an officer of the Staff of Industrial Mobilization a plant would be informed what it could make best in the way of war materials and would be supplied with the necessary government drawings to enable the plant to provide itself with a complete set of tools, dies, etc., for making that particular product. The concern would be given an annual order in peace times to enable its staff to become familiar with turning out that product, and also a contract would be made with the plant for the taking over of the plant and its force of men by the government in case of war at a price that would be a "living wage" to the stockholders, but not large enough to create a profit interest in war.

In addition to this economic phase of the chamber's plans, those who are behind the movement have worked out a system of "industrial arsenals," to be located on the principal traffic arteries of the United States. These arsenals, instead of housing ammunition and ordnance, will be repositories for working plans for mass production of munitions on a large scale. The Chamber of Commerce committees who have discussed this matter have formulated the "industrial arsenal" plan as a result of observation of the difficulties in England at the outbreak of the European War. It took England, they say, a full year to overcome difficulties which the "industrial arsenal" system would obviate completely.—*Army and Navy Journal*, 24/6.

NEW ZEALAND'S MILITARY SERVICE.—Five years ago the New Zealand Government placed on the statute book an act providing for the compulsory military training of all males between the ages of 18 and 25 years, writes a New Zealand correspondent of the *London Times*. At the time there was considerable opposition from the conscientious objector and from the irresponsible and undisciplined youth of the Dominion. The first year saw hundreds of prosecutions for failure to attend camps and parades, and rank treason was preached in the parks and at street corners. This was the work of the conscientious objectors. The other opposition was not so formidable, and the military authorities, backed by the law, soon put an end to it.

One of the most extraordinary features of the enforcement of the act was the gradual weakening of the malcontents and anti-military agitators. They started openly hostile, but went, although sullenly, to parades. After the first week of camp they began slowly to realize that they were enjoying themselves, and after their fortnight they went back to their work wiser, physically fit and ardent advocates of the Defence Act. In effect it meant that men of eligible age attended parades for two hours a week, one half day in a fortnight, and two weeks' camp a year. The result was surprising and at the same time pleasing.

And now, after five years, New Zealand, out of 1,000,000 population, has a force of 50,000 men under arms, 37,000 of whom are actually in the field. When war was declared she had a large percentage of trained men among those eligible for service, with the result that half the difficulties that beset the military authorities in England when Kitchener's armies were in the making were done away with.

Despite the Defence Act and the well trained force, it has been found necessary to provide further legislation for the maintenance of sufficient reinforcements for the force in the field. Quite recently a deputation of laboring men waited on the government and asked that a conscription bill should be brought in. It is coming in the form of the Government's Military Service bill, now before the New Zealand Parliament, and one of the most prominent, and at times most bitter, of the labor members in the Lower House has delivered his verdict on it. "Voluntaryism," he said, "has proved inequitable. Labor has less to fear from compulsion than anybody." This sentiment now obtains throughout the Dominion, and soon any slight opposition that now manifests itself will die away.—*Army and Navy Journal*, 1/7.

When the New Zealand Government's Military Service bill, which provides for compulsory service in this war when voluntaryism fails, passed the House of Representatives by a vote of 44 to 4, there was a scene of much enthusiasm and the members rose and sang the national air.

The votes against the bill were those of the legislators who represent labor. They had fought the measure tooth and nail on the ground that it was conscriptive and they had worked up considerable opposition to it among a section of the working class, including the Social Democrats. A league has been formed which pledges itself to resist "conscription," however severe the penalties attached to refusal to comply with the law.—*New York Times*, 15/7.

PATENTS A PROCESS TO MAKE GASOLINE.—Papers were received from Washington granting to Charles S. Palmer, Ph. D., a fellow in the Mellen Institute of Industrial Research of Pittsburgh, a patent on a process for the manufacture of gasoline by what the inventor calls a recomposition method. Those concerned believe the newly patented process may influence present conditions in the active market for gasoline. It is said that under this process the "gas" can be made for as low as 9 cents a gallon under existing market prices for the materials used.

It is said that the Palmer process consists of extracting gasoline from petroleum residues which have practically no volatile matter below a temperature of 300 degrees centigrade. When they are subjected to this temperature, under conditions prescribed by the process, about 75 per cent of their composition becomes volatile, and of this about 20 per cent is gasoline. The basis of the process is said to be the interrelated control of temperature, pressure and time, these factors being so applied that recomposition of the elements in the petroleum residue results, one of the recompounded products being gasoline.—*New York Times*, 15/7.

CURRENT NAVAL AND PROFESSIONAL PAPERS

NOTE.—Lack of space limits the scope of these references. Upon application, members of the Institute will be supplied with fuller references to current periodicals published in both the United States and foreign countries.

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UNITED STATES

1. SCIENTIFIC AMERICAN. **May 20.**—The Military Rifle, by *D. T. Hamilton.* Strategic Moves of the War. The Size of Naval Guns—Twelve 14-inch or Eight 17 Guns? War Game, X. **May 27.**—Shipbuilding Activity, by *J. G. Dorrance.* How Guns are Blown Up, by *E. C. Crossman.* Why the American Navy Lost Second Place. Military Telescopes and Binoculars. Diving and Diving Apparatus. War Projectiles, by *C. A. Tupper.* Steam Power for Aeroplanes, by *J. G. Dudley.* **June 3.**—Airships: Rigid, Semi-Rigid, and Non-Rigid. "Pupinized" Telephone Lines. Development of Military Aeroplanes. Industrial Preparedness, by *W. S. Gifford.* The Massachusetts Institute of Technology. **June 10.**—New British Dirigibles. The War Zeppelin. **June 17.**—The Great North Sea Battle. Mastery of the Air *vs.* Control of the Sea, by *Landislas d'Orsey.* Proposed German Nitrogen Monopoly. New System of Navigation and Nautical Astronomy, by *Captain F. E. Uttmark.* **June 24.** Throwing Liquid Fire. **July 1.**—Selecting Aviators. Lessons of the Battle of Skagerrack. **July 8.**—Launching of a 61-ton Zeppelin. America's Industrial Organization for Defence. Aerography. The *Duilio,* New Italian Liner.

2. SEA POWER.[1] **June.**—The *Pennsylvania*—World's Greatest Fighting Ship. Universal Service, by *Henry Breckinridge.* **July.**—Lessons of Skagerrack, by *Admiral George Dewey.* National Defence and Campaign Publicity, by *Perry Belmont.* Thought-out Navies, by *Admiral Fiske.*

3. THE NAVY. **May.**—Necessity for Defence. Why We Need a Navy General Staff, by *E. K. Roden.* **June.**—Rise and Decline of Our Naval Strength, by *J. Bernard Walker.*

4. SEVEN SEAS. **May.**—Some True American History, by *H. C. Davis.* Seaman's Act Revision, by *E. H. Goodwin.* The First Iron Ship in Our Navy, by *E. S. Chellis.* More Naval Academy Cadets, by *Henry A. Wise Wood.* Our Navy Really American. **June.**—The American Merchant Marine, by *P. H. W. Ross.* A Mobile Coast Defence System.

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[1] *Sea Power,* the first issue of which appeared in June, 1916, is a magazine undertaken under the auspices of the Navy League of the United States, the league having severed its connection with the *Seven Seas* with the May issue. The Institute takes this opportunity of welcoming a new publication dealing with naval affairs and policies.

5. INTERNATIONAL MARINE ENGINEERING. **June.**—Panama Colliers *Ulysses* and *Achilles*. **July.**—Naval Preparedness—The British Fleet. The American Merchant Marine, by *F. J. Nolan*. Clyde Liners Built on Great Lakes. New Steam Yacht *Winchester*. Steel Castings for American Merchant and War Vessels, by *E. F. Cone*.

6. AMERICAN PHILOSOPHICAL SOCIETY. **No. 3.**—America as Defender of Neutral Rights, by *L. S. Rowe*. Legal and Political International Questions and the Recurrence of War, by *T. W. Balch*. **No. 4.**—Discussion of International Law: (1) Outline, by *John Bassett Moore;* (2) Judicial Aspects—Arbitration, by *Charlemague Tower;* (3) Legal Aspects, by *George Grafton Wilson;* (4) International Administration, by *Philip Marshall Brown;* (5) World Organization, by *David Jayne Hill*. **No. 5.**—Sight and Signalling in the Navy, by *Alex. Duane*.

7. ANNALS AMER. ACAD. POLITICAL AND SOCIAL SCIENCE. **July.**—Discussions: (1) Basis of Durable Peace and Safeguards Against Future Conflicts; (2) What Program Shall United States Stand for in International Relations; (3) Effect of Large Army and Navy on Domestic Institutions and Policy.

8. JOURNAL OF AMER. SOCIETY OF MECHANICAL ENGINEERS. **June.**—Industrial Preparedness, by *Spencer Miller*. **July.**—Mechanical Equipment of Port of New Orleans, by *Wm. Von Puhl*.

9. JOURNAL MILITARY SERVICE INSTITUTION. **July-August.**—Military Training, Valuable and Valueless, by *Captain Stockton*. A Military System for the United States, by *Captain Wharton, I. N. G.* A Proper Military Policy for the United States, by *Army War College*.

10. FORUM. **July.**—What is Behind the Japanese Peril, by *Sigmund Henschen*. Our Threatening War Problem, by *Captain H. O. Stickney, U. S. Navy*.

11. JOURNAL OF UNITED STATES ARTILLERY. **June.**—A Study on the Use in Land Defence of Heavy Mobile Artillery. Principles Involved in Mine Defence of Harbors, by *Lieutenant C. A. Lohr*. Location of Coast Forts and Their Land Defences, by *Major H. E. Cloke*.

12. MARINE CORPS GAZETTE.[1] **March.**—A Century-old Tribute to the Need of Marines with the Fleet. The Mobile Defence of the Advance Base, by *Colonel J. A. Lejeune*. **June.**—Aid to Spotting Shots Ashore and Afloat, by *Captain Samuel W. Bogan*. Machine Guns and Automatic Rifles.

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13. NINETEENTH CENTURY AND AFTER. **June.**—Sea Power in its Dual Relation, by *Commander E. Hamilton Currey*. The Future of Asiatic Turkey, by *J. Ellis Barker*. Democracy and Diplomacy, by the *Earl of Cromer*.

14. FORTNIGHTLY REVIEW. Sea Rights and Sea Power: Great Britain and the United States, by *Sidney Low*. The Teachings of the Napoleonic War, by *Politicus*. America's Bid for Sea Power, by *Archibald Hurd*. Air Navies of the Future, by *W. O. Horsnaill*. History of the War, with Maps.

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[1] The *Marine Corps Gazette* is a new quarterly magazine under the editorship of Captain Frank E. Evans, U. S. M. C., Retired. The magazine is published at 24 E. 23d Street, New York, and the annual subscription is $3.00.

15. LAND AND WATER. **May 4.**—Contrasts in Sea Methods, by *Arthur Pollen.* Air Problems and Fallacies, by *F. W. Lanchester.* **May 11.**—The World's Trade After the War, by *L. F. Freeman.* **May 18.**—The Reality of Sea Power, by *Arthur Pollen.* **May 25.**—Dominions' Naval Help, by *Arthur Pollen.* **June 8.**—Battle of Jutland, by *Arthur Pollen.*

16. JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION. **June-July.**—Naval Events of Russo-Turkish War of 1787-1791, by *Lieutenant R. C. Anderson.* The Enemy Character of Merchant Ships (trans. from Italian *Rivista Marittima*). The War: Its Naval Side.

17. JOURNAL OF THE ROYAL ARTILLERY. **June.**—Attack on Zeppelins, by *General F. G. Stone.*

18. UNITED SERVICE MAGAZINE. **May.**—Blockade of French Fleets in Napoleonic Wars (prize essay), by *Lieutenant J. M. Grieve.* Submarines or Battleships? From the Tigris to the Texel, by *T. Miller Maguire.* The Record of the German Fleet, by *Hector Bywater.* **June.**—The German Aeroplanes, by *E. C. Bruce.* Kut-el Amara and After, by *Lieut. Colonel H. C. Yate.*

19. ENGINEERING. **June 16.**—Brazilian Submarine Depot Motor-Ship *Ceara.* Skin Friction Resistance of Ships. **June 23.**—Lessons from the Loss of the *Hampshire.*

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20. RIVISTA MARITTIMA (Italy). **April.**—Naval Events of the European War (Review of Warfare on Commerce). **May.**—Metals Used in War, by *Luigi Berberis.* Recent Experience in Propulsion of Naval Vessels, by *Leonardo Fea.* The Value of Dirigibles, by *W. Rossini.*

21. MARINEBLAD (Holland). **April 5.**—Diplomatic Negotiations Concerning Violations of International Law.

SOUTH AMERICA

22. REVISTA MARITIMA BRAZILEIRA. **March.**—Methods and Doctrine of War, by *Captain Eduardo de Brito e Cunha.* Notes on the Study of Naval Tactics, by *Commander Philip Williams.* Physiology of War, by *Lieut. Commander Raul Tavares.* Relations between Merchant Marine and Navy, by *Captain Firmino Santos.*

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Prepared by Lieut. Commander J. W. Greenslade, U. S. Navy

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THE BATTLE OF JUTLAND

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The treatment of the Battle of Jutland, which follows, was compiled from the most accurate published information that has been obtainable. The three accounts here published corroborate each other to a remarkable extent, when it is considered that they emanate from widely different independent sources. It is regretted that a more accurate and more detailed reconstruction of the battle cannot be furnished, but the information necessary is not as yet available. The first detailed account of the battle received in the United States and widely published (viz.: the account by British Naval Officers in the Glasgow Herald) has been proved in the light of subsequent reports to be quite inaccurate. Its principal errors are that (a) it credits Vice Admiral Beatty with a squadron of nine battle cruisers at the beginning of the action; (b) it states that the High Seas fleet stood down from the northeast, under cover of a smoke screen, to join the action; (c) it asserts that the British Grand fleet "crossed the T" of the High

Seas fleet when within gun range (and by inference urges us to believe that Admiral Jellicoe permitted "low visibility" to keep him from taking advantage of such an opportunity). [Secretary's note, J. W. G.]

ADMIRAL JELLICOE'S REPORT

"Be pleased to inform the Lords Commissioners of the Admiralty that the German High Sea fleet was brought to action on the 31st of May, 1916, to the westward of Jutland Bank, off the coast of Denmark."

In these words Vice Admiral Sir John R. Jellicoe, commander-in-chief of the home fleets, opens his report to the Admiralty on the battle over which there has been so much discussion. Continuing, Admiral Jellicoe says:

"The ships of the Grand fleet, in pursuance of the general policy of periodical sweeps through the North Sea, had left their base on the previous day in accordance with instructions issued by me. In the early afternoon of Wednesday, 31st of May, the first and second battle cruiser squadrons, the first, second, and third light cruiser squadrons and destroyers from the first, ninth, tenth, and thirteenth flotillas, supported by the fifth battle squadron, were, in accordance with my directions, scouting to the southward of the battle fleet, which was accompanied by the third battle cruiser squadron, the first and second cruiser squadrons, the fourth light cruiser squadron, and the fourth, eleventh, and twelfth flotillas.

"The junction of the battle fleet with the scouting force after the enemy had been sighted was delayed owing to the southerly course steered by our advanced force during the first hour after commencing their action with the enemy battle cruisers. This, of course, was unavoidable, as had our battle cruisers not followed the enemy to the southward the main fleets would never have been in contact.

"The battle cruiser fleet, gallantly led by Vice Admiral Beatty, and admirably supported by the ships of the fifth battle squadron under Rear Admiral Evan-Thomas, fought the action under, at times, disadvantageous conditions, especially in regard to light, in a manner that was in keeping with the best traditions of the service."

The report states that "the list of ships and commanding officers which took part in the action has been withheld from publication for the present in accordance with the usual practice."

Admiral Jellicoe estimates the German losses at two battleships of the dreadnought type, one of the *Deutschland* type, which was seen to sink; the battle cruiser *Lützow*, admitted by the Germans; one battle cruiser of the dreadnought type, "one battle cruiser seen to be so severely damaged that its return was extremely doubtful"; five light cruisers, seen to sink—one of them possibly a battleship; six destroyers, seen to sink; three destroyers so damaged that it was doubtful if they would be able to reach port, and a submarine sunk. (In the foregoing Admiral Jellicoe enumerates 21 German vessels as probably lost. The last British report placed the total at 18.) In concluding, Admiral Jellicoe says:

"The conditions of low visibility under which the day action took place and the approach of darkness enhanced the difficulty of giving an accurate report of the damage inflicted or the names of the ships sunk by our forces. But after a most careful examination of the evidence of all the officers who testified to seeing enemy vessels actually sink, and personal interviews with a large number of these officers, I am of the opinion that the list shown in the enclosure gives the minimum numbers, though it is possible it is not accurate as regards the particular class of vessel, especially those which were sunk during the night attack. In addition to the vessels sunk, it is unquestionable that many other ships were very seriously damaged by gunfire and torpedo attack.

"I deeply regret to report the loss of his Majesty's ships *Queen Mary, Indefatigable, Invincible, Defence, Black Prince, Warrior, Tipperary, Ardent, Fortune, Shark, Sparrow Hawk, Nestor, Nomad* and *Turbulent.*

Still more do I regret the resultant heavy loss of life. The death of such gallant and distinguished officers as Arbuthnot, Hood, Captain Sowerby, Captain Prowse, Captain Cay, Captain Bonham, Captain Charles J. Wintour and Captain Stanley B. Ellis, and those who perished with them, is a serious loss to the navy and to the country. They led officers and men who were equally gallant, and whose death is mourned by their comrades in the Grand fleet. They fell doing their duty nobly—a death which they would have been first to desire.

"The enemy fought with the gallantry that was expected of him. We particularly admired the conduct of those on board a disabled German light cruiser which passed down the British line shortly after deployment under a heavy fire, which was returned by the only gun left in action. The conduct of the officers and men was entirely beyond praise.

"On all sides it is reported that the glorious traditions of the past were most worthily upheld, whether in the heavy ships, cruisers, light cruisers or destroyers; the same admirable spirit prevailed. The officers and men were cool and determined, with a cheeriness that would have carried them through anything. The heroism of the wounded was the admiration of all. I cannot adequately express the pride with which the spirit of the fleet filled me.

"It must never be forgotten that the prelude to action is the work of the engine-room department. . . . . Several ships attained speeds that had never before been reached, thus showing very clearly their high state of steaming efficiency. Failures in material were conspicuous by their absence."

Of the medical officers Admiral Jellicoe says:

"Lacking in many cases all essentials for performing critical operations, with their staffs seriously depleted by casualties, they worked untiringly with the greatest success."

The hardest fighting fell to the battle cruiser fleet, says Admiral Jellicoe, the units of which were less heavily armored than their opponents, and he expressed high appreciation of the handling of all the vessels and commends Admirals Burney, Jerram, Sturdee, Evan-Thomas, Duff, and Leveson, and continues:

"Vice Admiral Sir David Beatty once again showed his fine qualities of gallant leadership, firm determination, and correct strategic fighting. He appreciated situations at once on sighting the first enemy's lighter forces, then his battle cruisers, finally his battleships. I can fully sympathize with his feelings when the evening mist and fading light robbed the fleet of that complete victory for which he had maneuvered, for which the vessels in company with him had striven so hard. The services rendered by him, not only on this but on two previous occasions, have been of the very greatest value."

Vice Admiral Beatty's report to Admiral Jellicoe particularly mentions the work of the *Engadine*, Commander Robinson, which towed the *Warrior* 75 miles during the night of May 31, and continues:

"It is impossible to give a definite statement of the losses inflicted on the enemy. Visibility was for the most part low and fluctuating. Caution forbade me to close the range too much with my inferior force. A review of all the reports leads me to conclude that the enemy's losses were considerably greater than those we sustained in spite of their superiority, and included battleships, battle cruisers, light cruisers, and destroyers. This is eloquent testimony to the very high standard of gunnery and torpedo efficiency of his Majesty's ships. The control and drill remained undisturbed throughout in many cases, despite the heavy damage to material and personnel.

"Our superiority over the enemy in this respect was very marked, their efficiency becoming rapidly reduced under punishment, while ours was maintained throughout. As was to be expected, the behavior of the ships' companies under the terrible conditions of a modern sea battle was magnificent without exception. The strain on their morale was a severe test

of discipline and training. The officers and men were imbued with one thought—a desire to defeat the enemy.

"The fortitude of the wounded was admirable. A boy of the first class, John Travers Cornwall, of the *Chester*, was mortally wounded early in the action. He, nevertheless, remained standing alone at a most exposed post quietly awaiting orders until the end of the action, with the gun's crew dead or wounded all around him. His age was under 16½ years. I regret that he has since died. I recommend his case for special recognition, in justice to his memory and as an acknowledgment of the high example set by him.

"In such a conflict as raged for five hours it was inevitable that we should suffer severe losses. It was necessary to maintain touch with greatly superior forces in fluctuating visibility, often very low. We lost the *Invincible*, the *Indefatigable* and *Queen Mary*, from which ships there were few survivors. The casualties in the other ships were heavy. I wish to express my deepest regret at the loss of so many gallant comrades, officers and men. They died gloriously."

Extracts from Vice Admiral Beatty's report give the course of events before the battle fleet came on the scene of action. At 2.20 o'clock in the afternoon the *Galatia* reported the presence of enemy vessels. At 2.35 o'clock considerable smoke was sighted to the eastward. This made it clear that the enemy was to the northward and eastward, and that it would be impossible for him to round Horn Reef without being brought to action. The course of the British ships consequently was altered to the eastward and subsequently north-eastward.

The enemy was sighted at 3.31 o'clock. His force consisted of five battle cruisers. Vice Admiral Beatty's first and third light cruiser squadrons, without awaiting orders, spread eastward, forming a screen in advance of the battle cruiser squadron under Admiral Evan-Thomas, consisting of four battleships of the *Queen Elizabeth* class. The light cruisers engaged the enemy and the cruiser squadron came up at high speed, taking station ahead of the battle cruisers. At 3.30 o'clock Vice Admiral Beatty increased the speed to 25 knots and formed the line of battle, the second battle cruiser squadron forming astern of the first, with two destroyer flotillas ahead.

Vice Admiral Beatty then turned east-southeast slightly, converging on the enemy now at a range of 23,000 yards. The fifth battle cruiser squadron was then bearing north-northwest 10,000 yards distant. The visibility was good. Continuing his report, Vice Admiral Beatty said:

"The sun was behind us. The wind was southeast. Being between the enemy and his base, our situation was both tactically and strategically good.

"Both forces opened fire simultaneously at 3.48 at a range of 18,500 yards. The course was altered southward, the enemy steering parallel distant 18,000 to 14,500 yards. The fifth battle squadron opened fire at a range of 20,000 yards at 4.08. The enemy fire then seemed to slacken. Although the presence of destroyers caused inconvenience on account of smoke, they preserved the battleships from submarine attack.

"Two submarines being sighted, and a flotilla of ten destroyers being ordered to attack the enemy with torpedoes, they moved out at 4.15 o'clock simultaneously with the approach of German destroyers. The attack was carried out gallantly with great determination. Before arriving at a favorable position to fire torpedoes they intercepted an enemy force consisting of one light cruiser and 15 destroyers. A fierce engagement at close quarters ensued and the enemy were forced to retire on their battleships, having two destroyers sunk and their torpedo attack frustrated. Our destroyers sustained no loss, but the attack on the enemy cruisers was rendered less effective.

"The *Nestor*, *Nomad*, and *Minotaur*, under Commander Edward Bingham, pressed the attack on the battle cruisers and fired two torpedoes. Being subjected to a heavy fire at 3000 yards, the *Nomad* was badly hit and remained between the lines. The *Nestor* also was badly hit, but was afloat when last seen. The *Petard*, *Nerissa*, *Turbulent*, and *Termagant* also are praised.

"These destroyer attacks," continues Vice Admiral Beatty, " were indicative of the spirit pervading the navy and worthy of its highest traditions."

From 4.15 to 4.43 o'clock the conflict between the battle cruiser squadrons was fierce and the resolute British fire began to tell. The rapidity and accuracy of the Germans' fire depreciated considerably. The third German ship was seen to be afire. The German battle fleet was reported ahead and the destroyers were recalled.

Vice Admiral Beatty altered his course to the northward to lead the Germans toward the British battle fleet. The second light cruiser squadron closed to 13,000 yards of the German battle fleet and came under heavy but ineffective fire. The fifth battle squadron engaged the German battle cruisers with all guns, and about 5 o'clock came under the fire of the leading ships of the German battle fleet.

The weather became unfavorable, Vice Admiral Beatty's ships being silhouetted against a clear horizon to the Germans, whose ships were mostly obscured by mist.

Between 5 and 6 o'clock the action continued at 14,000 yards on a northerly course, the German ships receiving very severe punishment, one battle cruiser quitting the line considerably damaged. At 5.35 o'clock the Germans were gradually hauling eastward and receiving severe punishment at the head of the line, probably acting on information from their light cruisers which were engaged with the third battle cruiser squadron or from Zeppelins which possibly were present.

At 5.56 o'clock the leading ships of the British battle fleet were sighted bearing north, distant five miles. Vice Admiral Beatty thereon proceeded east at the greatest speed, bringing the range to 12,000 yards. Only three German battle cruisers were then visible, followed by battleships of the *Koenig* type.

Vice Admiral Jellicoe then takes up the story of the battle fleet. Informed that the Germans were sighted, the fleet proceeded at full speed on a southeast by south course during two hours before arriving on the scene of battle. The steaming qualities of the older ships were severely tested. When the battle fleet was meeting the battle cruisers and the fifth battle squadron great care was necessary to insure that the British ships were not mistaken for the German warships.

Vice Admiral Beatty reported the position of the German battle fleet at 6.15 o'clock. Vice Admiral Jellicoe then formed the line of battle, Vice Admiral Beatty meantime having formed the battle cruisers ahead of the battle fleet, and the fleets became engaged. During the deployment the *Defence* and *Warrior* were seen passing between the British and German fleets under heavy fire. The *Defence* disappeared and the *Warrior* passed to the rear, disabled.

Vice Admiral Jellicoe considers it probable that Sir Robert K. Arbuthnot, the Rear Admiral who was lost on board the *Defence,* was not aware, during the engagement with the German light cruisers, of the approach of their heavy ships owing to the mist, until he found himself in close proximity to the main German fleet. Before he could withdraw his ships were caught under a heavy fire and disabled. When the *Black Prince* of the same squadron was sunk was not known, but a wireless signal was received from her between 8 and 9 o'clock.

Owing principally to the mist, it was possible to see only a few ships at a time. Toward the close of the battle only four or five were visible and never more than eight to twelve.

The third battle cruiser squadron, under Rear Admiral Horace Alexander Hood, was in advance of the battle fleet and ordered to reinforce Vice Admiral Beatty. While en route the *Chester,* Captain Lawson, engaged three or four German light cruisers for 20 minutes. Despite many casualties, her steaming qualities were unimpaired.

Describing the work of the third squadron, Vice Admiral Beatty said Rear Admiral Hood brought it into action ahead of the *Lion* " in the most inspir-

ing manner, worthy of his great naval ancestors." Vice Admiral Hood, at 6.25 p. m., was only 8000 yards from the leading German ship, and the British vessels poured a hot fire into her and caused her to turn away. Vice Admiral Beatty, continuing, reports:

"By 6.50 o'clock the battle cruisers were clear of our leading battle squadron and I ordered the third battle cruiser squadron to prolong the line astern and reduced the speed to 18 knots. The visibility at this time was very indifferent, not more than four miles, and the enemy ships were temporarily lost sight of after 6 p. m. Although the visibility became reduced, it undoubtedly was more favorable to us than to the enemy. At intervals their ships showed up clearly, enabling us to punish them very severely and to establish a definite superiority over them. It was clear that the enemy suffered considerable damage, battle cruisers and battleships alike. The head of their line was crumpled up, leaving their battleships as a target for the majority of our battle cruisers. Before leaving, the fifth battle squadron also was engaging battleships.

"The report of Rear Admiral Evan-Thomas shows excellent results were obtained. It can safely be said that his magnificent squadron wrought great execution."

The action between the battle fleets lasted, intermittently, from 6.17 to 8.20 o'clock at ranges between 9000 and 12,000 yards. The Germans constantly turned away and opened the range under the cover of destroyer attacks and smoke screens as the effect of the British fire was felt, and alterations of the course from southeast by east to west in an endeavor to close up brought the British battle fleet, which commenced action in an advantageous position on the Germans' bow; to a quarterly bearing from the German battle line, but placed Vice Admiral Jellicoe between the Germans and their bases.

Vice Admiral Jellicoe says: "During the somewhat brief periods that the ships of the High Sea fleet were visible through the mist, a heavy and effective fire kept up by the battleships and battle cruisers of the Grand fleet caused me much satisfaction. The enemy vessels were seen to be constantly hit, some being observed to haul out of the line. At least one sank. The enemy's return fire at this period was not effective and the damage caused to our ships was insignificant."

Vice Admiral Beatty's report covering this period says the German ships he was engaging showed signs of punishment. The visibility improved at sunset at 7.17, when he re-engaged, and destroyers at the head of the German line emitted volumes of gray smoke, covering their capital ships as with a pall, under cover of which they turned away and disappeared. At 7.45, the light cruiser squadrons, sweeping westward, located two German battleships and cruisers. At 8.20, Vice Admiral Beatty heavily engaged them at 10,000 yards. The leading ship, being repeatedly hit by the *Lion*, turned away in flames with a heavy list. The *Princess Royal* set fire to a three-funneled battleship. The *New Zealand* and *Indomitable* reported that the ship they engaged left the line heeling over and afire. At 8.40, the battle cruisers felt a heavy shock as if struck by a mine or torpedo. This was assumed to be a vessel blowing up.

Vice Admiral Beatty reported that he did not consider it desirable or proper to engage the German battle fleet during the dark hours, as the strategical position made it appear certain he could locate them at daylight under most favorable circumstances.

Vice Admiral Jellicoe reports that, as anticipated, the Germans appeared to have relied much upon torpedo attacks which were favored by low visibility and by the fact that the British were in the position of a following or chasing fleet. Of the large number of torpedoes apparently fired only one took effect and this was upon the *Marlborough*, which was able to continue in action. The efforts of the Germans to keep out of effective gun range were aided, he says, by weather ideal for that purpose. The Germans made two separate destroyer attacks. The first battle squadron at 11,000

yards administered severe punishment to battleships, battle cruisers and light cruisers. The fire of the *Marlborough* was particularly effective and rapid. She commenced by firing seven salvos at a ship of the *Kaiser* class and then engaged a cruiser and next a battleship. The *Marlborough* was hit by a torpedo at 6.54 p. m. and took a considerable list to starboard, but reopened fire at 7.03 at a cruiser. At 7.12 she fired 14 rapid salvos at a cruiser of the *Koenig* class, hitting her frequently until she left the line.

During the action the range decreased to 5000 yards. The first battle squadron received more of the enemy's fire than the remainder of the fleet, excepting the fifth squadron. The *Colossus* was hit, but not seriously.

The fourth squadron, led by the flagship *Iron Duke,* engaged a squadron consisting of the *Koenig* and *Kaiser* classes with battle cruisers and light cruisers. The British fire was effective, although a mist rendered range-taking difficult. The *Iron Duke* fired on a battleship of the *Koenig* class at 12,000 yards. The hitting commenced at the second salvo and only ceased when the target turned away. Other ships of the squadron fired principally at German ships as they appeared out of the mist and several of the German vessels were hit.

The second squadron under Admiral Jerram engaged vessels of the *Kaiser* or *Koenig* classes and also a battle cruiser, which apparently was severely damaged. A squadron under the command of Rear Admiral Heath, with the cruiser *Duke of Edinburgh,* acted as a connecting link between the battle fleet and the battle cruiser fleet, but did not get into action.

The German vessels were entirely out of the fight at 9 o'clock, says the report. The threat of destroyer attacks during the rapidly approaching darkness made it necessary to dispose the fleet with a view to its safety, while providing for a renewal of action at daylight. Vice Admiral Jellicoe maneuvered the fleet so as to remain between the Germans and their bases, placing flotillas of destroyers where they could protect the fleet and attack the heavy German ships.

The British heavy ships were not attacked during the night, but three British destroyer flotillas delivered a series of gallant and successful attacks, causing heavy losses. The fourth flotilla, under Captain Wintour, suffered severe losses, including the *Tipperary.* The twelfth flotilla, under Captain Stirling, attacked a squadron of six large vessels of the *Kaiser* class, taking it by surprise and firing many torpedoes. The second, third, and fourth ships in the line were hit and the third blew up. The destroyers were under a heavy fire of German light cruisers. Only the *Onslaught* received material injuries. The *Castor* sank a German destroyer at point-blank range.

The thirteenth flotilla, under Captain Farie, was stationed astern of the battle fleet. A large vessel crossed in the rear of the flotilla after midnight at high speed. Turning on her searchlights, she fired heavily on the *Petard* and the *Turbulent* and the latter was disabled. The *Champion* was engaged for a few minutes with four German destroyers, while the *Moresby* fired a torpedo at a ship of the *Deutschland* class and felt an explosion.

Concluding his account of the battle, Vice Admiral Jellicoe wrote:

"At daylight on the first of June, the battle fleet, being southward of Horn Reef, turned northward in search of the enemy vessels and for the purpose of collecting our own cruisers and torpedo-boat destroyers. The visibility early on the first of June was three to four miles less than on May 31, and the torpedo-boat destroyers, being out of visual touch, did not rejoin the fleet until 9 a. m. The British fleet remained in the proximity of the battlefield and near the line of approach to German ports until 11 a. m., in spite of the disadvantage of long distances from fleet bases and the danger incurred in waters adjacent to the enemy's coasts from submarines and torpedo craft.

"The enemy, however, made no sign, and I was reluctantly compelled to the conclusion that the High Sea fleet had returned into port. Subsequent events proved this assumption to have been correct. Our position must have been known to the enemy, as, at 4 a. m., the fleet engaged a Zeppelin about

five minutes during which time she had ample opportunity to note and subsequently report the position and course of the British fleet.

"The waters from the latitude of Horn Reef to the scene of action were thoroughly searched and some survivors from the destroyers *Ardent*, *Fortune* and *Tipperary* were picked up. The *Sparrow Hawk*, which had been in collision, was no longer seaworthy and was sunk after the crew was taken off. A large amount of wreckage was seen, but no enemy ships, and at 1.15, it being evident that the German fleet had succeeded in returning to port, our course was shaped for our bases, which were reached without further incident on Friday, the second of June.

"The cruiser squadron was detached to search for the *Warrior*, which had been abandoned while in tow of the *Engadine* on the way to the base, owing to bad weather setting in, and the vessel becoming unseaworthy. No trace of her was discovered, and further subsequent search by the light cruiser squadron having failed to locate her, it was evident she had foundered.

"The fleet was fueled, replenished its ammunition, and at 9.30 p. m., on the second of June, was reported ready for further action."

Two estimates of the total tonnage lost by the Germans in the Jutland battle have been made by British officials. The more conservative one, who included in his list only vessels "seen to sink," and based his estimate on the theory that the battleships sunk were of the oldest dreadnought type, gives the German tonnage lost as 109,220, as compared with a British loss in tonnage of 112,350. He concludes that the Germans lost two battleships of the dreadnought type of 18,900 tons each, one of the *Deutschland* type of 13,200 tons, the battle cruiser *Lützow* of 28,000 tons, five cruisers of the *Rostock* type, making a total of 24,500 tons for this type; six destroyers aggregating 4920 tons, and one submarine of 800 tons.

The more liberal estimate places the German loss at 117,220 tons, as follows:

One dreadnought of the *Kronprinz* type, 25,480 tons; one of the *Helgoland* type, 22,440 tons; battleship *Pommern*, 13,000 tons; battle cruiser *Lützow*, 28,000 tons; five *Rostocks*, aggregating 24,500 tons; destroyers aggregating 4000, and a submarine of 800 tons.

Under the caption "The Battle of Jutland and What It Means," the British Government will issue in London (July 7) a statement, in part, as follows:

"Seen in its broadest aspect, the battle stands out as a case of a tactical division of the fleet, which had the effect of bringing an unwilling enemy to battle. Such a method of forcing an action was obviously drastic and necessarily attended with a certain measure of risk.

"In the present case there was only an appearance of division. The battle fleet was to the north and the battle cruiser fleet to the south, but they formed, in fact, one fleet, under a single command, and were acting in combination with one another. They were at the time actually engaged in carrying on, as they had been in the habit of doing periodically, a combined sweep of the North Sea, and Admiral Beatty's fleet was, in effect, the observation of advance squadron."

Admiral Sir Cyprian Bridge has prepared the following commentary on Admiral Jellicoe's report:

"To put the situation succinctly, it may be said that before the battle the British fleet at sea was divided into two parts, one force under Sir David Beatty and the other, the battle fleet or main body, under the commander in chief, Sir John Jellicoe. This distribution of the ships was the dominating factor in bringing on the battle. Had the whole British fleet been massed and close together it is more than likely that no battle would have occurred at all. So with the British fleet divided the Germans were encouraged to give battle with Beatty. Sir David, determined to get them into a fight, arranged the management of the action so that he could draw

them nearer and nearer to Jellicoe's main body which was coming up in support. He thus greatly shortened the interval between the first collision and eventual participation in the action by Jellicoe's battleships.—*New York Times*, 7/7.

EARLY GERMAN REPORTS

The preceding report of Admiral Jellicoe is so complete that it is unnecessary to publish the official bulletins previously issued by the British Admiralty. On the other hand, the German Admiralty's account is incomplete without the series of statements which went before it; they are therefore published.

It will be noticed that the times given in the German report are two hours later than those of Admiral Jellicoe's; after correcting the time discrepancy the two reports check each other very closely even down to details of maneuvering.

The first German communiqué, dated June 1, was as follows:

"During an enterprise directed towards the north, our High Sea fleet on Wednesday last met a considerably superior main portion of the British battle fleet. In the course of the afternoon between the Skager-Rack and the Horn Reef a number of severe and, for us, successful engagements developed and continued all night.

"In these engagements, as far as is at present ascertained, we destroyed the great battleship *Warspite*, the battle cruisers *Queen Mary* and *Indefatigable*, two armored cruisers of the *Achilles* class, one small cruiser, and the new destroyer-leaders *Turbulent*, *Nestor*, and *Alcaster*. According to trustworthy evidence a great number of British battleships suffered heavy damage from the artillery of our vessels and the attacks of our torpedo-boat flotillas during the day battle and during the night. Among others the great battleship *Marlborough* was hit by a torpedo, as is confirmed by the statements of prisoners. A portion of the crews of the British vessels that were sunk were picked up by our vessels. Among them are two sole survivors of the *Indefatigable*.

"On our side the small cruiser *Wiesbaden* was sunk by enemy's artillery in the day engagements, and during the night the *Pommern* was sunk by a torpedo. Regarding the fate of the *Frauenlob*, which is missing, and some torpedo-boats, which have not returned up to the present, nothing is known. The High Sea fleet returned to our harbors in the course of to-day."

This was supplemented on June 3 by the following:

"In order to prevent the spread of fantastic reports, it is again stated that in the battle off the Skager-Rack on May 31 the German High Sea forces engaged the entire modern British fleet. To the statements already published it must be added that according to the official British report the battle cruiser *Invincible* and the armored cruiser *Warrior* were also destroyed.

"We were obliged to blow up the small cruiser *Elbing*, which on the night of May 31 was heavily damaged owing to collision with another German war vessel, so that it was impossible to take her back to port. The crew were rescued by torpedo boats, with the exception of the commander, two officers, and 18 men who remained on board in order to blow up the vessel, and who, according to subsequent Dutch reports, have been brought to Ymuiden in a tug and landed there."

On June 8, the longest of the German communiqués was received. It opens by controverting "all official and semi-official press reports from the British side, which are systematically spread abroad in order to deny the greatness of the British defeat in the naval battle on May 31 and create the impression that the battle was a victory for the British arms." The telegram continues:

"It is asserted, for instance, that the German fleet left the battlefield, and that the British fleet remained master of it. As regards this, it is stated that by the repeated and effective attacks of our torpedo-boat flotillas during the battle on the evening of May 31 the British main fleet was forced to

turn round and never again came within sight of our forces, and in spite of its superior speed and reinforcements by a British battle squadron of 12 vessels, which came up from the southern region of the North Sea,* never attempted to come again into touch with our forces to continue the battle or to effect a junction with the above-mentioned squadron in order to bring about the desired destruction of the German fleet.

"The British assertion that the British fleet in vain endeavored to reach the fleeing German fleet in order to defeat it before reaching its home points d'appui is contradicted by the alleged official British statement that Admiral Jellicoe with his Grand fleet had already reached his base at Scapa Flow (Orkneys), 300 miles from the battlefield, on June 1.

"Our numerous German torpedo-boat flotillas which were sent out after the battle to make a night attack towards the north beyond the theatre of the day battle did not find the British main fleet in spite of a keen search. Moreover our torpedo-boats were able to rescue a large number of British survivors of various vessels which had been sunk.

"As further proof of the fact disputed by the British of the participation of the entire battle fleet in the battle, it is pointed out that the British Admiralty report announced that the *Marlborough* was disabled. Furthermore, one of our submarines on June 1 sighted another vessel of the *Iron Duke* class heavily damaged steering toward the English coast. Both the vessels mentioned belong to the British main fleet.

"In order to belittle the great German success, the British press also attributes the loss of several British vessels to German mines, submarines, and airships. In this connection it is expressly pointed out that neither mines (which, by the way, would have been just as dangerous to our own fleet as to that of the enemy) nor submarines were employed by our High Seas fleet, and German airships were exclusively used for reconnaissance work.

"The German victory was gained by able leadership and by the effect of our artillery and torpedoes. Until now we have refrained from contradicting many of the alleged official British assertions regarding German losses. The latest assertion, again and again repeated, is that the German fleet lost not less than two vessels of the *Kaiser* class, the *Westfalen*, two battle cruisers, four small cruisers, and a great number of destroyers.

"Moreover, the British indicate that the *Pommern*, which we reported lost, is not a ship of the line of 13,000 tons, built in 1905, but a modern dreadnought of the same name. We state that the total loss of the German High Sea forces during the battle of May 31 and June 1 and subsequently are:

"One battle cruiser.

"One ship of the line of older construction.

"Four small cruisers, and

"Five torpedo-boats.

"Of these losses the *Pommern*, launched in 1905, the *Wiesbaden*, the *Elbing*, the *Frauenlob*, and five torpedo-boats have already been reported sunk in official statements.

"For military reasons we refrained till now from making public the loss of the vessels *Lützow* and *Rostock*. In view of the wrong interpretation of this measure, and, moreover, in order to frustrate English legends about gigantic losses on our side, these reasons must now be dropped. Both vessels were lost on their way to the harbor after attempts had failed to keep the heavily damaged vessels afloat. The crews of both ships, including all severely wounded, are in safety. While the German list of losses is hereby closed, positive indications are to hand that the actual British losses are materially higher than established and made public by us on the bases of our own observation.

"British prisoners state that besides the *Warspite*, the *Princess Royal*, and the *Birmingham* were also destroyed. According to reliable reports the dreadnought *Marlborough* also sank before reaching port.

* A squadron of 12 of the older British battleships has been maintained in the Channel, based generally on Portland.

"The battle of the Skager-Rack was and remains a German victory, even if the result is judged solely by the losses in ships officially admitted by the British.

"The total tonnage of German losses is 60,720 tons, against 117,750 tons British losses."—*The Army and Navy Gazette*, 17/6.

ESTIMATE OF FORCES ENGAGED

BERLIN, June 8, by wireless to Sayville, N. Y.

At the high tide of battle during the North Sea action of last week the strength of the British and German fleets engaged as given to-day from an authoritative German source was:

"British—At least 25 dreadnoughts, six battle cruisers and at least four armored cruisers.

"German—16 dreadnoughts, five battle cruisers, six older German battleships and no armored cruisers."

In addition, numerous light warships were engaged.—*Washington Star*, 8/5.

GERMAN ADMIRALTY'S ACCOUNT

BERLIN, June 29 (via London, June 30).

The German Admiralty has given to The Associated Press a detailed account of the recent naval battle in the Skagerak. The following abstract has been taken from the Admiralty statement:

"The High Seas fleet, consisting of three battleship squadrons, five battle cruisers, and a large number of small cruisers, with several destroyer flotillas, was cruising in the Skagerak on May 31 for the purpose, as on earlier occasions, of offering battle to the British fleet. The vanguard of small cruisers at 4.30 o'clock in the afternoon suddenly encountered, 90 miles west of Hanstholm (a cape on the northwest coast of Jutland), a group of eight of the newest cruisers of the *Calliope* class and 15 or 20 of the most modern destroyers.

"While the German light forces and the first cruiser squadron under Vice Admiral Hipper were following the British, who were retiring northwestward, the German battle cruisers sighted to the westward Vice Admiral Beatty's battle cruiser squadron of six ships, including four of the *Lion* type and two of the *Indefatigable* type. Beatty's squadron developed a battle line on a southeasterly course and Vice Admiral Hipper formed his line ahead of the same general course and approached for a running fight. He opened fire at 5.49 o'clock in the afternoon with heavy artillery at a range of 13,000 meters against the superior enemy. The weather was clear and light, and the sea was light with a northwest wind.

"After about a quarter of an hour a violent explosion occurred on the last cruiser of the *Indefatigable* type. It was caused by a heavy shell, and destroyed the vessel.

"About 6.20 o'clock in the afternoon five warships of the *Queen Elizabeth* type came from the west and joined the British battle cruiser line, powerfully reinforcing with their 15-inch guns the five British battle cruisers remaining after 6.20 o'clock. To equalize this superiority Vice Admiral Hipper ordered the destroyers to attack the enemy. The British destroyers and small cruisers interposed, and a bitter engagement at close range ensued, in the course of which a light cruiser participated.

"The Germans lost two torpedo-boats, the crews of which were rescued by sister ships under a heavy fire. Two British destroyers were sunk by artillery, and two others—the *Nestor* and *Nomad*—remained on the scene in a crippled condition. These later were destroyed by the main fleet after German torpedo-boats had rescued all the survivors.

"While this engagement was in progress a mighty explosion, caused by a big shell, broke the *Queen Mary*, the third ship in line, asunder at 6.30 o'clock.

"Soon thereafter the German main battleship fleet was sighted to the southward, steering north. The hostile fast squadrons thereupon turned northward, closing the first part of the fight, which lasted about an hour.

"The British retired at high speed before the German fleet, which followed closely. The German battle cruisers continued the artillery combat with increasing intensity, particularly with the division of the vessels of the *Queen Elizabeth* type, and in which the leading German battleship division participated intermittently. The hostile ships showed a desire to run in a flat curve ahead of the point of our line and to cross it.

"At 7.45 o'clock in the evening British small cruisers and destroyers launched an attack against our battle cruisers, who avoided the torpedoes by maneuvering, while the British battle cruisers retired from the engagement, in which they did not participate further as far as can be established. Shortly thereafter a German reconnoitering group, which was parrying the destroyer attack, received an attack from the northeast. The cruiser *Wiesbaden* was soon put out of action in this attack. The German torpedo flotillas immediately attacked the heavy ships.

"Appearing shadow-like from the haze bank to the northeast was made out a long line of at least 25 battleships, which at first sought a junction with the British battle cruisers and those of the *Queen Elizabeth* type on a northwest to westerly course and then turned on an easterly to a southeasterly course.

"With the advent of the British main fleet, whose center consisted of three squadrons of eight battleships each, with a fast division of three battle cruisers of the *Invincible* type on the northern end, and three of the newest vessels of the *Royal Sovereign* class, armed with 15-inch guns, at the southern end, there began about 8 o'clock in the evening the third section of the engagement, embracing the combat between the main fleets.

"Vice Admiral Scheer determined to attack the British main fleet, which he now recognized was completely assembled and about doubly superior. The German battleship squadrons, headed by battle cruisers, steered first toward the extensive haze bank to the northeast, where the crippled cruiser *Wiesbaden* was still receiving a heavy fire. Around the *Wiesbaden* stubborn individual fights under quickly changing conditions now occurred.

"The light enemy forces, supported by an armored cruiser squadron of five ships of the *Minotaur, Achilles,* and *Duke of Edinburgh* classes coming from the northeast, were encountered and apparently surprised on account of the decreasing visibility by our battle cruisers and leading battleship division. The squadron came under a violent and heavy fire, by which the small cruisers *Defence* and *Black Prince* were sunk. The cruiser *Warrior* regained its own line a wreck and later sank. Another small cruiser was damaged severely.

"Two destroyers already had fallen victims to the attack of German torpedo-boats against the leading British battleships and a small cruiser and two destroyers were damaged. The German battle cruisers and leading battleship division had in these engagements come under increased fire of the enemy's battleship squadron, which, shortly after 8 o'clock, could be made out in the haze turning to the northeastward and finally to the east. Germans observed, amidst the artillery combat and shelling of great intensity, signs of the effect of good shooting between 8.20 and 8.30 o'clock particularly. Several officers on German ships observed that a battleship of the *Queen Elizabeth* class blew up under conditions similar to that of the *Queen Mary*. The *Invincible* sank after being hit severely. A ship of the *Iron Duke* class had earlier received a torpedo hit, and one of the *Queen Elizabeth* class was running around in a circle, its steering apparatus apparently having been hit.

"The *Lützow* was hit by at least 15 heavy shells and was unable to maintain its place in line. Vice Admiral Hipper, therefore, transhipped to the *Moltke* on a torpedo-boat and under a heavy fire. The *Derfflinger* meantime took the lead temporarily. Parts of the German torpedo flotilla at-

tacked the enemy's main fleet and heard detonations. In the action the Germans lost a torpedo-boat. An enemy destroyer was seen in a sinking condition, having been hit by a torpedo.

"After the first violent onslaught into the mass of the superior enemy the opponents lost sight of each other in the smoke by powder clouds. After a short cessation in the artillery combat Vice Admiral Scheer ordered a new attack by all the available forces.

"German battle cruisers, which with several light cruisers and torpedo-boats again headed the line, encountered the enemy soon after 9 o'clock and renewed the heavy fire, which was answered by them from the mist, and then by the leading division of the main fleet. Armored cruisers now flung themselves in a reckless onset at extreme speed against the enemy line in order to cover the attack of torpedo-boats. They approached the enemy line although covered with shot from 6000 meters distance. Several German torpedo flotillas dashed forward to attack, delivered torpedoes, and returned despite the most severe counterfire with the loss of only one boat. The artillery fight was again interrupted, after this second violent onslaught, by the smoke from guns and funnels.

"Several torpedo flotillas, which were ordered to attack somewhat later, found, after penetrating the smoke cloud, that the enemy fleet was no longer before them; nor, when the fleet commander again brought the German squadrons upon the southerly and southwesterly course, where the enemy was last seen, could our opponents be found. Only once more—shortly before 10.30 o'clock—did the battle flare up. For a short time in the late twilight German battle cruisers sighted four enemy capital ships to seaward and opened fire immediately. As the two German battleship squadrons attacked, the enemy turned and vanished in the darkness. Older German light cruisers of the fourth reconnoissance group also were engaged with the older enemy armored cruisers in a short fight. This ended the day battle.

"The German divisions, which, after losing sight of the enemy, began a night cruise in a southerly direction, were attacked until dawn by enemy light force in rapid succession. The attacks were favored by the general strategic situation and the particularly dark night.

"The cruiser *Frauenlob* was injured severely during the engagement of the fourth reconnoissance group with a superior cruiser force, and was lost from sight.

"One armored cruiser of the *Cressy* class suddenly appeared close to a German battleship and was shot into fire after 40 seconds, and sank in four minutes."—*New York Times*,—1/7.

THE BATTLE OF JUTLAND

By ARTHUR POLLEN

In the early afternoon of Wednesday, May 31, a battle was begun between the battle cruisers of the British and German fleets. The action was fought in misty weather in which contact between the two fleets was occasionally lost. The fighting, therefore, was necessarily of an intermittent character. More especially was this the case in its later phases. From a quarter to four until a quarter to five the engagement was between the battle cruisers only. By this time von Hipper had been driven back on to the High Seas fleet and the British fast squadron, reinforced by four *Queen Elizabeths* fought a holding action for the next hour and a quarter, drawing the German High Seas fleet towards the forces that were approaching under Admiral Jellicoe. During this phase the British squadron was greatly outnumbered, of course, by the Germans, but at 6 they were reinforced by Rear Admiral Hood with three further battle cruisers, and at 6.20 by Rear Admiral Sir Robert Arbuthnot with four armored cruisers of the *Defence* and *Duke of Edinburgh* classes.

Shortly after 6.30 Sir John Jellicoe brought the Grand fleet on to the field of battle, upon which von Sheer retreated incontinently. From 7 o'clock until darkness fell, the bad light, the thick weather, and the disorderly retreat of the German squadron made anything like an artillery duel between the two fleets impossible. The German destroyers did all in their power to hamper the pursuit by the British dreadnoughts, and when pursuit by the capital ships was made impossible by darkness, the British destroyers were sent forward amongst the German ships. There then followed a night action, the pursuit being carried on by the British cruisers and destroyers until 3 on the following morning, when such of the German fleet as survived had reached the mine defences of their main base. The commander-in-chief then recalled his fleet, and at daylight made a systematic search of the scene of the previous day's engagement, but without finding any disabled ships. At noon the British force returned to its bases, refuelled, and 24 hours later was once more ready for action. * * * *

The Germans had entered the North Sea according to their own account to engage and destroy the British ships that have been systematically sweeping the waters north and east of the Horn Reef. The plan of overwhelming the British fast division with superior numbers was defeated by the masterly handling of the British force, combined with the effective use that force made of its artillery. So far from Sir David Beatty having been overwhelmed, he succeeded admirably in his main object, which was to draw the German fleet into a position where Sir John Jellicoe's squadrons could engage it. * * * *

THE STORY OF THE BATTLE

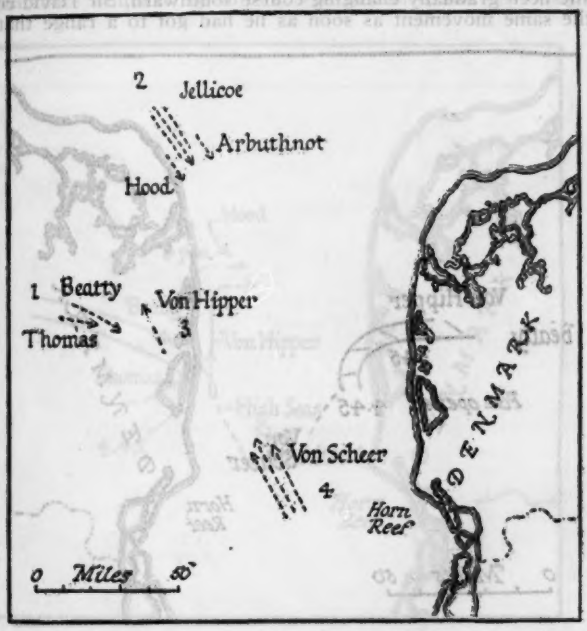
I have attempted in the following pages to collate all the available information and to elucidate it by a series of sketch charts to illustrate the principal phases of the action. But I offer this narrative and these sketches with considerable reserve. Practically nothing is known of the movements of the main fleet after contact was made round about 7 o'clock in the evening. Of the pursuit from then till darkness all the accounts are most confused. And of the final phase—the night attack by the British light craft on the flying German fleet—nothing is known whatever, except that the commander-in-chief seems to have recalled all his units at about 3 in the morning of June 1. The narrative and sketches then, are offered for what they are worth, and no more can be claimed for them than that they contain nothing, so far as I am aware, inconsistent with reliable information to hand. Though the positions of the fleets are, I believe, generally correct, the sketches are not to scale and indicate only the general direction and character of each movement. In the phase, for instance, in which Sir David Beatty, weakened by the loss of *Indefatigable* and *Queen Mary* was reinforced by Admiral Evan-Thomas's four *Queen Elizabeths*, I have indicated the courses of the British vice admiral and of the German fleet as straight and continuous. It is most improbable that this can represent the events of an hour and a quarter of fighting. So, too, with the rest. At many periods during the afternoon the shifting mists and fogs made it impossible for the British to see their opposite numbers in the German line, and again and again the gunlayers had no other mark to aim at but the flashes of their opponents' guns. These conditions not only made gunnery extremely difficult, they made it quite impossible for participants to keep any clear recollection of the courses steered.

THE DISPOSITION OF THE OPPOSING FLEETS

This sketch indicates the approximate position at 2.15[1] of the forces engaged in the course of the afternoon of Wednesday, May 31, Sir David Beatty was at position 1, steering southeast or east-southeast. He had with him four *Lions*, *Indefatigable* and *New Zealand*. There were of

[1] Should be 3.45.—J. W. G.

course some flotillas of destroyers and probably more than one squadron of light cruisers. Throughout these sketches the small craft have not been indicated, but they must be assumed to accompany all of the main squadrons. Slightly astern and a little to the southward of Sir David Beatty, Rear Admiral Evan-Thomas, flying his flag in *Barham*, commanded a squadron of four *Queen Elizabeths*, the name ship only being absent. Some 75 miles north by east of Admiral Beatty was the Grand fleet under Sir John Jellicoe, steering a south-easterly course. With Sir John Jellicoe was a squadron of three battle cruisers under Rear Admiral Hood, *Invincible*, *Inflexible* and *Indomitable*, and, in addition to light cruisers and small craft, Sir Robert Arbuthnot's squadron of four armored cruisers of the *Defence* and *Duke of*

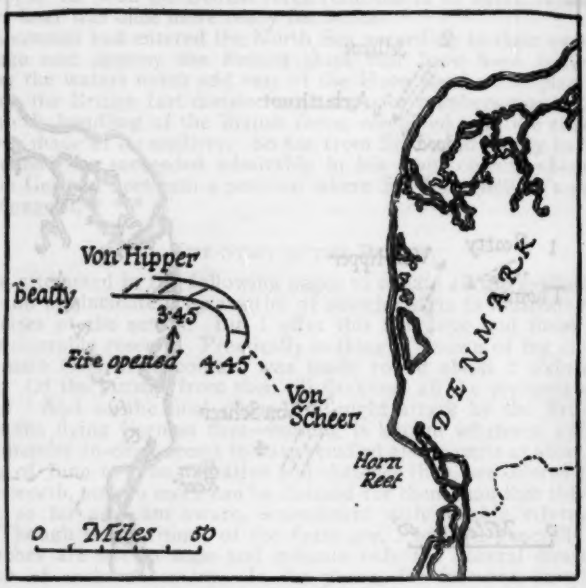


PLAN I.—The opposing forces at (approximately) 2.30 p. m. [to 3.45 p. m. —J. W. G.], May 31. 1.—BEATTY: *Lion* (flag), *Tiger*, *Queen Mary*, *Princess Royal* (flag), *Indefatigable*, *New Zealand* (flag); E. THOMAS: *Barham*, *Valiant*, *Warspite*, *Malaya*. 2.—JELLICOE: *Iron Duke* (flag), a, b, d battle squadrons; HOOD: *Invincible* (flag), *Inflexible*, *Indomitable*. ARBUTHNOT: *Defence*, *Warrior*, *Black Prince*, *Duke of Edinburgh*; 3.—VON HIPPER: *Hindenburg*, *Derflinger*, *Lutzow*, *Seydlitz*, *Moltke*; 4.—VON SCHEER: With 3 *Koenigs*, 5 *Kaisers*, 4 *Heligolands*, 4 *Westphalens*, and 6 pre-dreadnoughts.

Edinburgh classes. Ten miles to the northeast of Sir David Beatty, von Hipper—who commanded in the affair of the Dogger Bank, January, 1915—was in command of five German battle cruisers, *Derflinger*, *Lutzow*, *Moltke*, *Seydlitz*, and either *Von der Tann* or *Hindenburg*, probably the latter. This squadron was heading north by west; and some 60 miles astern of him was the High Seas fleet under Vice Admiral von Scheer, consisting of all the German dreadnoughts, 16 in number. He also had with him half a dozen pre-dreadnoughts of the *Deutschland* and *Braunschweig* classes.

It was when the fleets were so disposed that the advanced light cruisers

of Sir David Beatty and von Hipper's squadrons sighted each other and Sir David thereupon closed the German squadron at top speed. Von Hipper immediately turned his squadron eight points to starboard, and steered either east or east-southeast, and a stern chase followed. After about an hour and a half the battle cruisers got within 18,000 yards of the enemy, now bearing northwest[2] from them, and opened fire. The four *Queen Elizabeths* had necessarily been left behind in this chase. The mist being thick and visibility poor, Sir David Beatty closed the range fairly rapidly and 10 minutes after the engagement had become general *Indefatigable* was hit, blew up and sank. Twenty minutes later *Queen Mary* shared the same fate. One German cruiser was also sunk at this stage. Von Hipper had meanwhile been gradually changing course southward, Sir David conforming to the same movement as soon as he had got to a range that it was



PLAN II

imprudent further to reduce. His squadron, it must be remembered, had now been reduced from six to four. Southerly courses were followed until, at about a quarter to five, the entire fleet of German dreadnoughts was seen coming straight up to von Hipper.

THE HOLDING ACTION

The latter then put his helm over, turned 16 points to starboard and took station at the head of the German line, where he had three *Koenigs* and five *Kaisers* immediately astern of him. The gradual turn southwards had enabled Sir Evan-Thomas to bring up his squadron, and when Sir David turned 16 points, so as to keep a course approximately parallel to the enemy's, but a position slightly ahead of the German line,[3] Admiral Thomas was able to fall in behind the battle cruisers and engage both those of the

[2] Northeast?—J. W. G.
[3] See correction of June 15, page 1349.

German battle cruisers that had survived and the leading ships of the German dreadnought fleet. At this stage of the action the British fast division had maneuvered itself into a position so much in advance of its opponents that the leading enemy ship bore about 40 degrees abaft the beam. There ensued an action lasting for about an hour and a quarter between these very disproportionate forces. But the English ships had the speed of the German, and seven out of the eight vessels had guns that would have been much more effective at long range had the weather conditions permitted of their being used to the full advantage. It is uncertain how many of the German battle cruisers were still in action at this point. Certainly not more than four, and possibly only three. But even with a lesser number the German force would be 19 ships to the British 8, and obviously it was

PLAN III.—4.45 (approximately 6.20 p. m.).

Sir David's duty to draw them northward, rather than to seek close and decisive action.

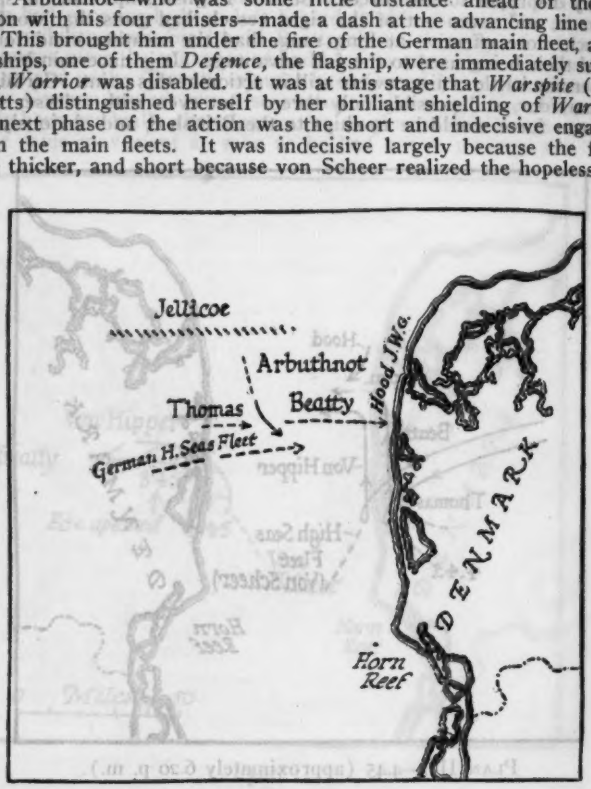
At about 6 o'clock the first reinforcement from the Grand fleet came upon the scene, and Sir David now being sufficiently ahead of the Germans to execute the right maneuver, turned eight points to starboard, thus forcing[1] the German line to turn also or be enfiladed. Shortly after this turn, say at about 6.10 or 6.15, Admiral Hood with *Invincible*, *Inflexible* and *Indomitable* swung gallantly into line ahead of the vice admiral, and at once opened a very accurate fire on the leading German ships. Almost immediately, however, *Invincible* shared the fate of *Queen Mary* and *Indefatigable*.

Sir John Jellicoe's fleet was now deploying for an immediate attack on the German fleet. To enable the Grand fleet to make its attack, Sir David Beatty forged ahead as fast as possible to the east, after ordering Rear Admiral Evan-Thomas to take station with the battleships. The battle

[1] See correction of June 15, page 1349.

cruisers had by this time done their task and the finish of the action was to be handed over to the commander-in-chief. The Germans, to whom the imminent participation of Sir John Jellicoe in the action was apparent, promptly sent destroyers and light cruisers forward to hamper the British advance by torpedo attacks. It was apparently to ward off or thwart these that Sir Robert Arbuthnot—who was some little distance ahead of the battle squadron with his four cruisers—made a dash at the advancing line of light craft. This brought him under the fire of the German main fleet, and two of his ships, one of them *Defence*, the flagship, were immediately sunk, and a third, *Warrior* was disabled. It was at this stage that *Warspite* (Captain Phillpotts) distinguished herself by her brilliant shielding of *Warrior*.

The next phase of the action was the short and indecisive engagement between the main fleets. It was indecisive largely because the fog had become thicker, and short because von Scheer realized the hopelessness of

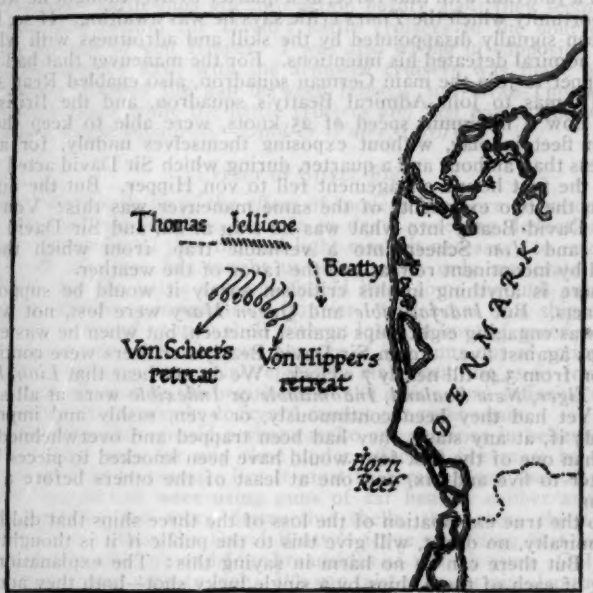


PLAN IV.—Approximately 6.40-7.00 p. m.

a regular artillery combat with the British commander-in-chief's forces. But it lasted long enough to show von Scheer what would happen if it continued. *Iron Duke* and the other leading ships got in some useful salvos, but hardly had the leading squadrons become engaged than a disorderly flight began, the details of which are far too confused for narration or diagrammatic reproduction. So long as daylight lasted the German destroyers and light craft did all that was possible to protect their main forces. First they sent up *barages* of smoke, which mixing with the fog and mist made a barrier impenetrable to sight; secondly, they darted in groups of four and five out of this barrage to launch torpedoes against the advancing British ships. In the result the German fleet was well off in its flight before Sir John Jellicoe could either locate its position or shake off the destroyers for an organized pursuit. The pursuit was, however, carried

on until the gradually fading daylight made gunnery impossible and the battleships consequently useless.

Sir David Beatty, in the meantime, in pushing forward eastward to enable the battleships of the Grand fleet to come into action, had a second objective in view as well. In getting between the German fleet and the coast of Jutland, he headed off the possibility of a German retreat into the Sound or any attempt, by either single fast ships or commerce raiders, to break past the British fleet and gain the Atlantic. There seems some authority for supposing that, almost as darkness fell, that is at 8.30 or shortly afterwards, he exchanged shots with the group of ships that had been leading the German line before. At this stage there were seemingly only two German battle cruisers left, but the *Koenigs* and *Kaisers* that composed the rest of the squadron could not be usefully engaged in the light that gave the British 13.5 guns no range advantage.



PLAN V.—Grand fleet joins action, approximately 7.00-7.30 p. m.

THE GENERAL CHASE

The final stage of the battle was the pursuit of the retreating German ships by the British destroyers and light craft. This continued for no less than six hours, and it was not until 3 in the morning that the commander-in-chief was satisfied that all such German ships as could still steam had found their way behind the mine defences of Heligoland and the main German bases. All battleships, cruisers and destroyers were now recalled—the battle cruiser squadron being at this point as far south as latitude 55. By daybreak on the anniversary of the glorious first of June, the victorious British fleet reformed and made a systematic search of the scene of the previous day's engagements. It was a vast area that had to be swept. The fighting and pursuit had extended by daylight alone over an equilateral nearly 100 miles by 100. But by noon no trace of friends or enemy had been found and the fleet returned to its bases.

INTERPRETATIONS AND COMMENTS

The suggestion has been made many times that the loss of *Queen Mary*, *Indefatigable* and *Invincible* is to be explained by their having been employed "in rash and impetuous" tactics, or sent to engage a superior force by the "over-confidence" of the admiral responsible for their movements. One critic has gone so far as to say that the opportunity afforded the German commander-in-chief to overwhelm an inferior British force with greatly superior numbers was exactly what the enemy was looking for. No impartial examination of the events, as I have recorded them, affords the slightest justification for any such aspersions. When Sir David Beatty, with his six battle cruisers sighted von Hipper with five, he certainly went for them at his top speed and fought them as hard as he could. Von Hipper probably thought that he was carrying out his own plan and not Sir David's, in falling back upon the German High Seas fleet, and, doubtless, when he effected a junction with that force, at a quarter to five, thought he would get the opportunity which the *Times* critic says he was awaiting. If so, he must have been signally disappointed by the skill and adroitness with which the British admiral defeated his intentions. For the maneuver that had enabled von Hipper to join the main German squadron, also enabled Rear Admiral Evan-Thomas to join Admiral Beatty's squadron, and the British ships having now a minimum speed of 25 knots, were able to keep the entire German fleet in play, without exposing themselves unduly, for a period of no less than an hour and a quarter, during which Sir David acted the part that in the first hour's engagement fell to von Hipper. But the difference between the two exponents of the same maneuver was this: Von Hipper led Sir David Beatty into what was no trap at all, and Sir David led von Hipper and Von Scheer into a veritable trap, from which they only escaped by incontinent retreat and the favor of the weather.

If there is anything in this criticism surely it would be supported by some facts. But *Indefatigable* and *Queen Mary* were lost, not when Sir David was engaging eight ships against nineteen, but when he was engaging six ships against five. Again Sir David Beatty's cruisers were continuously in action from 3.40 till nearly 7 o'clock. We do not hear that *Lion, Princess Royal, Tiger, New Zealand, Indomitable* or *Inflexible* were at all seriously hurt. Yet had they been continuously, or even, rashly and imprudently exposed; if, at any stage, they had been trapped and overwhelmed, surely more than one of the first four would have been knocked to pieces between a quarter to five and six, and one at least of the others before a quarter to seven.

As to the true explanation of the loss of the three ships that did blow up, the Admiralty, no doubt, will give this to the public if it is thought wise to do so. But there can be no harm in saying this: The explanation of the sinking of each of these ships by a single lucky shot—both they and practically all the other cruisers were hit repeatedly by shots that did no harm—is, in the first place, identical. Next, it does not lie in the fact that the ships were insufficiently armored to keep out big shell. Next, the fatal explosion was not caused by a mine or by a torpedo. Lastly, it is in no sense due to any instability or any other dangerous characteristic of the propellants or explosives carried on board. I am free to confess that when I first heard of these ships going down as rapidly as they did, one of two conclusions seemed to be irresistible—either a shell had penetrated the lightly armored sides and burst in the magazine, or a mine or torpedo had exploded immediately beneath it. But neither explanation is right."[8]—*Land & Water*, 8/6/16.

PLAN OF ACTION

The plan of the action followed by the British fleet was undoubtedly that formulated by the commander-in-chief. He had not on this occasion to consider any new or unrehearsed problem. The fleet was embarking on a

[8] See last paragraph of personal narrative, page 1360.

maneuver which it had performed on innumerable previous occasions. The task allotted to each section of the fleet was the result of past experience and a careful consideration of all the probabilities. The objective was to bring the enemy's fleet as a whole to action. The plan, therefore, had to take into consideration a thousand contingencies and obviously could not be the best possible plan for dealing with any particular one of them. The question is in point of fact one that can only be discussed intelligibly when all the experience and information available to the commander-in-chief are known, and conclusions, as misleading as they may be unjust, will be put forward if the disposition of the fleet is discussed, as if the position and plans of the enemy were known before the British fleets left their ports.

* * * *

I have to make two corrections in the account of the action which I gave last week and in the diagrams. First, it seems clear that Rear Admiral Evan-Thomas's battleships got into action before 4.45; they seem to have fallen into line behind Sir David's battle cruisers in the course of the southerly pursuit of von Hipper. I was also wrong in supposing that Sir Robert Arbuthnot's dash with the armored cruisers was made after Sir David Beatty formed the gap between himself and Evan-Thomas. The incident took place while the battle cruisers and fast battleships were still fighting as a single squadron.—*Land & Water*, 15/6/16.

EFFECT OF SHELL FIRE

Far too few details as to the effect of modern shell fire on modern ships are as yet available for it to be safe to draw sweeping deductions. But when it is remembered that the bad light made it necessary to engage at a range which this war has taught us to consider only moderate it seems astonishing that the battle cruisers should have come through such severe punishment with such insignificant injuries. One hears of a ship receiving over 50 hits of 11 and 12-inch shell without losing a knot of speed, one-tenth of her complement, or having one-quarter of her guns out of action—as an actual fact, needing no essential repairs to make her just as fit for fighting at the end as she was at the beginning of the action, and suffering no damages that very few weeks in dockyard cannot put right again.

This is a thing that should perhaps make one cautious in believing every enemy ship that was for any time under effective fire must be virtually destroyed, or shot to pieces. But it must be remembered that all through the action the British were using guns of far heavier caliber and, consequently, throwing far more destructive shells, than were the Germans. From 3.45 till 6 o'clock, Sir David Beatty's force was firing first four, then three broadsides of 13.5's and four broadsides of 15-inch guns. Only one of his ships was armed with 12-inch. We can take it as certain also that in the short time that the Grand fleet was engaged, it would be the 15-inch and 13.5 gun ships that were principally in action. Where, therefore, there is reliable evidence of these ships having brought enemy vessels under a succession of salvos, it seems reasonable to suppose that he must have suffered, hit for hit, far more heavily than we did.

* * * *

Surely nothing more decisive than the recent battle can well be imagined. One of the most distinguished of German admirals, the president of the German Naval League, von Koester, is clearly under no illusions whatever on this point. For speaking at a meeting of that extremely combatant body on Sunday last in Berlin, he explained that the task before the German fleet was to protect Germany against enemy attacks, to keep open the ocean thoroughfares, to destroy the enemy's trade, and in the highest degree damage the enemy in revenge for his efforts to starve Germany. What more damning comment on the Kaiser's claim to a sea victory could be uttered? His audience must have been rudely disillusioned. For protecting Germany against hostile attack has only one meaning. It is to forbid the use of the sea to the enemy as a line of communication for his invading forces, and it

is immaterial whether the attack comes through France, or directly through a point seized on the German coast. But since the second week in August, 1914, the British army has been transported over the sea for the attack of Germany without, so far as is known, the loss of a single transport, though their numbers have been incalculable. This part, then, of the German fleet's task has never been attempted. And the ocean thoroughfares were closed before the first transport was sent! Not since the 6th of August has a German ship from overseas entered a German port. The third division of its duties has, it is true, been essayed. Fifty-six British ships were captured or sunk by surface craft in the short five months before the last of the fugitive German cruisers was run down and sunk off Juan Fernandez. The tale of submarine success was longer—but so discreditable that it had to be abandoned in the face of the protests from the civilized world. The last of von Koester's categories is really the most interesting—to do the "utmost damage to the enemy." Apart from the submarine campaign, how has the German navy sought to discharge this duty?

And first, we must realize that our Battle Cruiser fleet stands in a relation to the Grand fleet that has no parallel on the German side. The Grand fleet without Sir David Beatty was undoubtedly superior in strength to the united German fleet. We then could *afford the luxury of division ships faster than the rest,* because their fitness to "lie in the line" was sacrificed to speed. But the enemy was in a different case. It should long since have been recognized that as navies only exist to win or dispute the command of the sea, and that as command follows the victory of the main force of one side over the main force of the other, Germany in setting up a navy should have concentrated her effort on producing the greatest amount of fighting force that her financial and other sacrifices would give her. Up to the completion of the *Lutzow* and the last of the *Koenigs* the big ship navy that Germany had actually built for herself consisted of six battle cruisers and 17 battleships. Why did she build battle cruisers?

BATTLESHIPS *vs.* BATTLE CRUISERS

Writing immediately after Sir David Beatty's pursuit of von Hipper in 1915, I pointed out that the most serious of Germany's naval mistakes was her failure to realize that no naval forces except those capable of disputing command with our main forces could be of the slightest use to her. The armored cruiser *Bluecher* and her six battle cruisers can hardly have cost her less than £14,000,000 sterling. This is a sum that would have produced at least seven battleships, of which five could have been ready at the outbreak of the war. Had they been ready, Germany might have had 21 or 22 dreadnoughts in commission in August, 1914, at a time when we had only 20 in the Grand fleet!—*Land & Water,* 22/6/16. (Arthur H. Pollen.)

DEBATABLE QUESTIONS

There being available but little professional comment from the German point of view on the conduct of the action, it may not be out of place to call attention here to some of the phases which will create much discussion in the final analysis of the battle.

British observers record that the fire of the German battle cruisers was very heavy and accurate at the beginning of the action, which seems to indicate that the Germans established their range at once and that their guns of lighter caliber, but higher rate of fire, gave them a certain advantage under the conditions that existed. Both sides agree that the *Indefatigable* and *Queen Mary* had blown up before the arrival on the scene of the High Seas fleet. So that this phase of the action begun with six battle cruisers against five, ended with four against five, despite any resistance that Rear Admiral Evan-Thomas' division may have given.

It is recorded that the German battle cruisers countermarched first (to take position ahead of their High Seas fleet) and were followed in this

maneuver by Admiral Beatty's fleet. It will be inferred, however, that the German battle cruisers continued until covered by their main body before making the maneuver, and that the British fleet was forced to turn by the oncoming German dreadnoughts. This is borne out by the fact that the German squadron turned towards the west to obtain its position at the head of the column, while the British battle cruisers countermarched away from the High Seas fleet. This latter would seem to have been a hasty maneuver with no time or perhaps means for signalling for a simultaneous turn away. Though perhaps the only maneuver that could be used under the circumstances, it was a dangerous one, performed under gun-fire. It would not be surprising then that the British suffered much more heavily during the early part of the action than their opponents.

That the "Holding Action" was justified almost any one will admit; however, the English point of view on the subject has been given in the Pollen Comments. A news dispatch containing extracts from a letter written by Vice Admiral Beatty bears on this subject also, and is added here:

LONDON, June 6.

Rear Admiral Sir Hedworth Meux, who was elected to the seat in the House of Commons left vacant by Admiral Lord Charles Beresford, when the latter was created a baron and who has become a spokesman for the navy, read at a public meeting to-day the following letter from Vice Admiral Sir David Beatty, who commanded the battle cruiser squadron in the North Sea fight:

"We drew the enemy into the jaws of our fleet. I have no regrets, except for the gallant lives lost, for the pals that have gone and who died gloriously. It would have warmed your heart to have seen how the gallant Hood brought his squadron into action. Would to God he had been more successful in the general result.

"We will be ready for them next time. Please God it will come soon. The battle cruiser fleet is alive and has a very big kick in her."

Vice Admiral Beatty's report to Admiral Jellicoe that he did not consider it desirable or proper to engage the German battle fleet during the dark hours, indicate that no serious attempt was made to push home the chase after night fall. This is not to be wondered at as a pursuing force would have everything to lose in groping through darkness, fog, smoke screens and mine fields with little chance of achieving definite result.

The more one peruses both official and personal narratives, the greater does one's admiration for the entire range of professional abilities of the opposing fleets become. The Battle of Jutland will go down in history as one in which each side missed in succession the completion of its mission by the narrowest of margins through no fault or neglected effort, but through the sound strategy and maneuvering ability of the opposing force. (J.W.G.)

BRITISH BLOCKADE STILL ON

A REVIEW OF THE SITUATION A MONTH AFTER THE JUTLAND BATTLE

By ARCHIBALD HURD

Four weeks have passed since the Battle of Jutland was fought, and it is possible, in the light of an immense mass of information from British and neutral sources, to form what will prove the verdict of the historian on one of the most splendid incidents in our annals.

In the first place, if any doubt exists abroad as to whether the Germans were beaten, it may be suggested that consideration be given to the following, among other facts:

"(1) The British blockade has continued without intermission, and the activity in preventing cargoes reaching or leaving Germany has been, if anything, greater since June 1 than it was before that date.

"(2) Four weeks have elapsed since the battle was fought, and the German High Seas fleet has not, either as a whole or in part, ventured into

the North Sea during that period; the British fleet has held the North Sea as in a vice.

"(3) The German High Seas fleet has not only not emerged into the North Sea, but it has since been hidden away even from the observation of the Germans. Wilhelmshaven, the great North Sea base, has been sealed; it is surrounded by a barbed-wire entanglement; no one may go in or out; the trains even are stopped. No step has been omitted to prevent any persons seeing the men-of-war. Much the same secrecy is being enforced at Kiel.

"(4) A judicial sifting of the evidence of British officers and men shows that the Germans lost five capital ships—that is, vessels of the dreadnought type—in the action, besides six, or possibly seven light cruisers, a large number of destroyers, and at least two submarines."

* * * *

The truth is that as a fighting force the German battle cruiser squadron, under Rear Admiral von Hipper, does not exist. Such ships as do not lie at the bottom of the North Sea are in such a damaged condition that they will not be seen at sea in the course of the summer. The battle squadrons also suffered badly in the engagement of May 31-June 1. They are in no condition to embark on a further "enterprise to the northward," to quote the official statement issued from Berlin.

When the war opened Germany possessed the following ships of the cruiser classes (built and building) less than 15 years old—the age for replacement under the navy law—those lost in the course of the war being given:

"Battle cruisers—original number, 8; since lost, 6, comprising the *Lützow, Goeben, Seydlitz*—a complete wreck—*Blücher, Hindenberg* and another of similar type, with, it is believed, the *Von der Tann.*

"Large cruisers—original number, 7; since lost, 5, comprising the *Yorck, Scharnhorst, Gneisenau, Friedrich Karl* and *Prince Adalbert.* The two remaining vessels are the *Roon* (launched in 1903) and *Prinz Heinrich* (1900). The *Fürst Bismarck* (1897) is of no military value; she is believed now to be serving as a training ship.

"Light cruisers—original number, 30; since lost, 20, comprising the *Karlsruhe, Magdeberg, Köln, Mainz, Emden, Dresden, Nürnberg, Könighberg, Leipsig, Bremen, Undine, Rostock, Wiesbaden, Breslau, Frauenlob, Elbing, Ariadne* and three others the names of which have not yet been revealed."

Out of the 45 effective cruisers of all classes which the enemy had, built and building, when the war opened, she possesses to-day only 14, and of these a large proportion were so seriously injured in the Battle of Jutland as to be at present ineffective. Those cruisers have to suffice for many and various duties.

Consequently the High Seas fleet is blind, except for such aid as Zeppelins can render in favorable weather, and they cannot fight ships of war on the sea.

In any event the German High Seas fleet, lacking many of its original units and secreted in a damaged state behind its barbed wire entanglements, does not exist to-day as a fighting force. In the meantime the economic pressure which the British fleet has been exerting is still pressing heavily on the German Empire in virtue of the command of the sea, which was reaffirmed, with splendid gallantry, at the Battle of Jutland.—*New York Herald,* 4/7.

LESSONS OF THE BATTLE OF SKAGERRACK

By ADMIRAL DEWEY

The battle of Skagerrack seems to have justified the position which has long been taken by the experts of the General Board of the American Navy, a position which has met the approval of most American authorities and which has been crystallized into the program which America has followed.

The General Board has recommended for 15 years that the United States continue the policy of placing its chief reliance in big ships. Since the dreadnought came into being it has maintained that that vessel should be made the backbone of the fleet. If appropriations were sufficient to provide but one class of ships, the General Board has insisted that they be dreadnoughts.

AMERICAN PROGRAM JUSTIFIED

There is a constant tendency on the part of the public to go off at a tangent in its enthusiasm for the class of ship that at a given time is attracting wide attention. Last fall, for instance, the public clamored for many submarines and favored disregarding appropriations for dreadnoughts or battle cruisers. Later, the battle cruiser has been attracting much attention to itself because the incidental clashes of the present war have been battles between scout ships. So the clamor this spring has been very largely for battle cruisers.

The dreadnought has attracted very little attention because she has not heretofore been in the fighting. The public did not see that the very existence of British dreadnoughts in the North Sea resulted in the bottling up of all Germany. It did not generally realize that the battleship was performing its purpose without the necessity of fighting. The present clash, however, demonstrates that in the final issue it is the dreadnought which means victory or defeat.

This battle seems also to have proven the value of that other branch of the fighting fleet which has been given most attention in the American Navy, the destroyer. The many opportunities for usefulness of and the great possibilities of execution which rest with these little ships seem to have been demonstrated. The battle of Skagerrack seems to have shown that the United States has chosen wisely in selecting the units upon which she would depend in making a fleet from appropriations that made it impossible to have all the units desired.

The usefulness of the battle cruiser or the scout cruiser has not been disproven, but the inadvisability of depending upon the fast lightly armored vessels in a clash in which dreadnoughts are engaged is shown. The cruiser is a necessity in any modern fleet unless that fleet is willing to grant certain advantages to its rivals which are provided with these fast ships. The theory that a time would come when they would displace dreadnoughts must, however, in the face of the new facts, be given over.

The battle of Skagerrack teaches less of the value of guns of various calibers than of most of the vital problems of the navy. All the fighting was close in. The marksmanship was, therefore, not very exacting. The test on the guns was not great. Any gun and almost any gunner ought to be able to make hits at six miles. The advantage attributed to British guns and gunners had little opportunity to demonstrate itself. Likewise are the results in ships sunk by the British cruisers and dreadnoughts still unknown. The deadliness of the great British 15-inch gun cannot yet be said to have been determined.—By courtesy of *Sea Power*.

LESSONS ON THE JUTLAND FIGHT

Opinions naturally vary as to the result of the battle and the lesson it conveys to the U. S. Navy, yet in one essential all agree, namely, that the batte has demonstrated the superiority of the dreadnought. In this respect naval opinion is that American naval policies and theories have been vindicated and that one important theory of the British Admiralty has been exploded. This theory was that battle cruisers might be classed as ships of the first line and take their place with the dreadnoughts. On the contrary, it has been held in our navy that the proper function of battle cruisers was scouting and screening and other auxiliary functions.

When the Dogger Bank fight occurred came the first intimation that battle cruisers could not be considered ships of the first line in fighting characteristics, and the latest North Sea battle confirms this in every

respect. It is the opinion of officers at the Navy Department that the British battle cruisers got into a place in the battle for which they were entirely unsuited. In some quarters there has been a tendency to criticise the commander of the battle cruiser fleet, and particularly the commanders of the light armored cruisers for impetuously rushing into a struggle where they were at such a disadvantage.

Officers in the bureaus at Washington still believe that the German fleet was greatly aided by its apparently superior intelligence service, maintained perhaps through aircraft. Yet there is not now the same tendency to extol the importance of aircraft as when the first news arrived. As to gunnery, it is suggested that the rapidity of the German gunfire at close quarters and under certain conditions was an important factor, but the recently announced German contention that the smaller but more rapid firing 11-inch guns would be more effective than the larger but slower 14- and 15-inch guns has not been taken seriously.

The strategy of the Germans seems to have surpassed that of the British and to have been the main cause of their success in administering so sharp a blow to their adversaries. The Germans "got the most men there first." Such a result was a natural outcome of the fact that the Germans have paid more attention to strategy than the British have, both in the navy as well as in the army. It shows the value of the General Staff methods pursued by the Germans in their navy for many years and that the British Navy has only recently adopted; which, in fact, they have practically copied from the Germans. Probably the Germans could not have achieved such success if they had not obtained early news of the fact that the two parts of the British force were separated by such a distance that the battle cruiser detachment could not get support in time, if it was attacked without delay. But it was due to a trained preception of strategic situations that the Germans recognized their opportunity.

This battle in the North Sea was as much a battle of brains as of material and men.—*The Army & Navy Journal.*

MORE GUNS OF SMALLER CALIBER

One lesson of the Jutland Battle, however, should not be lost sight of. It is that the long-range heavy caliber gun is inferior to the medium caliber gun with greater rapidity of fire, in an engagement at close quarters. It had been assumed by the so-called "blue water" school of naval strategists, to which most British and American naval officers belong, that engagements at close range were a thing of the past and that under no possibility could the more lightly armed vessel have any chance against a heavier opponent. The Battle of Jutland shows that this assumption is not of universal application and that in given circumstances, concentration of fire from a number of lighter guns on a heavily armed vessel may be sufficient to put her out of action. This is what happened in the case of *Queen Mary, Invincible* and *Indefatigable*, which are believed to have been sunk at 16,000 yards by the German battleship division of pre-dreadnoughts armed with a large number of 11-inch weapons.

* * * *

The one outstanding lesson of the fight, however, is that the battle cruiser is only a cruiser after all and that while it was perfectly rational on the part of Germany to build battle cruisers as a part of her program of rivalry of Great Britain on the seas, such vessels are totally unsuited to form part of the floating strength of a country such as ours, which is so situated by nature that it needs a formidable first line fleet that will either completely demolish a potential invader or be sunk at sea and leave the country dependent upon its military resources to repel invasion. Under such circumstances, speed is not a primary factor and this view has so far prevailed in American naval policy.

* * * *

Battle cruisers are unsuited to the needs of a nation such as this, which requires primarily a ponderous battle fleet attended by a full complement of destroyers, scouts, etc., with the objective of destroying an enemy far out at sea, where the necessity of husbanding his fuel supplies will cause him to moderate his speed. However, Congress is not to be blamed for having appropriated in the last naval bill five battle cruisers and no battleships. After being told repeatedly by naval officers that we should have battle cruisers which cost as much as battleships—the extra cost being represented by their useless speed—Congress decided that the best way to remedy the deficiency was to build five of them at once and no ships of the first line, battle cruisers being represented as being as strong as battleships. Now comes the Battle of Jutland to prove that battle cruisers are only cruisers and immediately it is expected that Congress will add two battleships to the program already decided on. Our naval history reveals the fact that the worst heresies perpetrated in the naval construction line have always been based upon the theories of one class of naval officers who succeeded in winning the ear of Congress. The word is now with the advocates of the battle cruiser and like all naval types copied by this country from European models, the battle cruiser is not adapted to our needs. American naval policy demands the design and construction of a class of ships evolved according to the geographic situation of this country, irrespective of what other nations with other strategic problems to face are doing.—*Shipping Illustrated*, 10/6.

EVENTS LEADING UP TO THE BATTLE. MISSIONS ASCRIBED TO THE FLEETS

To Attack Details

The German High Sea fleet put to sea from the Schillig Roads, behind Heligoland, early on Wednesday morning. Everything was out. The battle cruiser squadron, under the command of Vice Admiral Hipper, led, while the battle fleet, with all its heavy and light units, followed under Vice Admiral Scheer. It was accompanied by an enormous flotilla of torpedo craft and by aerial scouts. The fleet pursued a northerly course, leading towards the coast of Norway. Its purpose was an unexplained "enterprise," which, if it comprised the engagement of some section of our fleet without its supports, must be held to have been achieved. To throw the whole of his strength on a portion of the preponderating British fleet and overwhelm it was a natural course to suggest itself to the German commander-in-chief, and for its accomplishment the advantage given him by his long-distance look-outs in the air must have been considerable. At some hour in the afternoon Admiral Hipper's vanguard came into collision with a squadron under Admiral Beatty's command. The actual point of contact appears to have been to the westward of Hantsholm Point, on the west coast of Jutland, but the place and the exact time are at present uncertain. It may be pointed out that British and German time differs, and also probably that of any neutrals who saw the fight.—*London Times Correspondent*, 5/6.

To Break Blockade

BERLIN, Saturday, June 3 (by wireless to The Associated Press.)

A competent German authority to-day gave the German Admiralty's version of the battle between the British and German main naval fleets off the coast of Jutland on May 31, as follows:

"The German High Seas forces advanced in order to force into battle divisions of the British Navy which of late had repeatedly been reported near the south coast of Norway."—*New York Times*, 7/6.

To Divert Attack on Russia

BERLIN, Saturday, June 3 (by wireless to The Associated Press).

Just what the purpose of the British fleet was in its expedition to the Skagerrack naturally is not known here, but it is assumed that it was a strategic move designed to keep back the German fleet in the North Sea, and at the same time to prevent an action against the Russians in the Baltic. This view is strengthened by recollection of recent articles in the Russian and British press, in which it was declared the Russian fleet was stronger and better prepared than ever, but that the chances of German offensive actions appeared decidedly greater. Hence the indicated tactics for the British fleet consisted in bringing pressure to bear to compel the Germans to keep their whole fleet in the North Sea.—*New York Times*, 7/6.

To Release Commerce Destroyers

AMSTERDAM, June 11.

An interesting fact has just come to light as to the German Admiralty's intentions in connection with the naval battle of May 31.

A large number of very fast commerce destroyers were convoyed by the German battle fleet on the night preceding the battle, the intention being to evade the British Grand fleet during the fighting, which, probably, was not intended to amount to a general engagement.

The Germans wished to give their commerce raiders the opportunity to repeat the exploits of the *Emden* and the *Möwe*. In this there is every reason to believe that they badly failed and that few, if any, of the ships destined for that purpose returned to port.—*London Times*, 12/6.

To Prevent Reenforcement of Russian Fleet

By giving battle to the British fleet in the Skagerrak on the last day of May the German High Seas fleet prevented the British naval force entering the Baltic and making Denmark a base of operations against the Teutonic powers, according to an opinion expressed by the Hamburger *Fremdenblatt* in an editorial pointing out why Germans regard the outcome of the great naval battle as a victory.

* * * *

Vice Admiral Kalan von Hofe in the *Vossische Zeitung* asserts that Great Britain had heeded the admonitions of her allies and dispatched her fleet to break a freeway through the Belt and Sound and eventually bring Denmark into the war on the side of the Allies.

A cablegram sent out from Petrograd on June 11 asserted that a formidable British squadron really had succeeded in entering the Baltic following the Skagerrack fight, but this report has never been confirmed.

To Raid the White Sea

An eminent naval authority in France, Admiral Hautefeuille, thus sets forth his views in the Paris *Homme Enchaîné*:—

The German object was to permit the escape of two rapid forces intended to act at a distance. The first consisted of two very powerful cruisers, escorted by some 10 ships of less size and a strong body of destroyers. The second force consisted only of two ships, the *Wiesbaden* and the *Elbing*.

The first force was to go north, and evidently was to destroy certain ships which supply Russia with food by way of Archangel and Kola and bring back grain for England and France, and also was to destroy Kola and the establishment of the port of Archangel, which are of wood.

The second group is only composed of two vessels, but two vessels launched since the beginning of the war, constructed for the destruction of commerce in distant seas, vessels with high speed enabling them to fly from warships, with a wide radius of action at economical speed that permits them to avoid frequent coaling.

LOSSES

Official announcement of the British losses is contained in Admiral Jellicoe's report; the Admiralty communiqué of June 8 gives the German losses. Both sides persistently maintain that the opponent's reports of losses are incomplete, but lacking further evidence the admissions of losses must be accepted as correct. No mention of the damage sustained by the vessels which survived the action has been made. Perusal of many reports give the impression that the Germans, though losing fewer vessels, sustained much greater damage from gunfire and torpedo attacks. Several dispatches bearing on this subject are appended. Estimates of losses to personnel are of no value as losses on damaged ships have been withheld to prevent estimate of losses to matériel.

No further information has been given out in regard to the extent of the damages sustained by the German units. It is admitted frankly that they are by no means light, and the loss of personnel from the British shell fire also is conceded. Nevertheless the price of victory is regarded as relatively small.—*New York Times*, 3/6.

COPENHAGEN, Monday.

The *Wilhelmshavener Zeitung* contains a significant and prominent announcement, signed by the governor of the Fortress of Wilhelmshaven, informing the public that permission for temporary visits to the town will only be granted in cases of the utmost urgency during the next few months, and that written applications must be sent to the police beforehand.—*Reuter, London Times*, 7/6.

COPENHAGEN, June 11.

According to the *Kolding Avis*, extraordinarily rigorous measures are being applied along the German side of the frontier to prevent people living in districts near the German naval harbors from crossing into Denmark. The telephone wires connecting the Danish and German systems south of Fredericia were cut by the frontier guards a few days ago, although all traffic over them has been entirely suspended since the outbreak of the war. —*Reuter, London, Times*, 12/6.

BERLIN, June 26 (via London, June 27).

The Charlottenburg Technological Institute has conferred the honorary degree of Doctor of Engineering on Naval Constructor Bürkner, head of the Department of Construction in the Admiralty.

The degree was conferred in recognition "of the structural merits of German warships, particularly with regard to their non-sinkability after injury, as shown in the recent battle of the Skagerrak."—*New York Times*, 27/6.

LONDON, July 10.

As an immediate result of the great North Sea Battle nearly 200 British merchantmen have been released from Baltic ports, according to the morning papers.

These ships have been lying idle in Petrograd and other Baltic harbors since the outbreak of the war. They have passed through the Cattegat without interference from German warships and have arrived safely in British ports.—*New York Times*, 8/7.

The following is the British statement of losses:

BATTLE CRUISERS

	Tonnage	Armor Belt	Main Battery	Speed	Men	Completed
Queen Mary	27,000	9 in.	8 13.5-in.	33	1000	1913
Indefatigable	18,750	8 in.	8 12-in.	29.13	899	1911
Invincible	17,250	7 in.	8 12-in.	28.6	750	1908

ARMORED CRUISERS

	Tonnage	Armor Belt	Main Battery	Speed	Men	Completed
Defense	14,600	6 in.	4 9.2-in.	23	755	1908
Black Prince	13,550	6 in.	6 9.2-in.	20.5	704	1906
Warrior	13,550	6 in.	6 9.2-in.	22.9	704	1908
DESTROYERS						
Tipperary	1,900	....	.....	31	160	1914
Turbulent	....	....	.....	....	....	....
Fortune	920	....	.....	29.50	100	1912
Sparrow Hawk	950	....	3 4-in.	31.32	100	1912
Ardent	950	....	3 4-in.	31.32	100	1912
Nomad	....	....	.....	....	....	....
Nestor	....	....	.....	....	....	....
Shark	950	....	3 4-in.	31.32	100	1912

Army and Navy Journal, 10/6.

The German losses reported by the Admiralty are:

BATTLESHIP

	Tonnage	Armament	Speed	Date Completion
Pommern	13,040	4 11-in. 14 6.7-in.	19	1907
BATTLE CRUISER				
Lützow	28,000	8 12-in. 12 6-in.	27	July(?), 1915
LIGHT CRUISERS				
Rostock	4,820	12 4.1-in.	27.3	1914
Frauenlob	2,656	10 4.1-in.	21.5	1903
NEW LIGHT CRUISERS				
Elbing*	....	.....	....	....
Wiesbaden*	....	.....	....	....
DESTROYERS				
Five	....	.....	....	....

ZEPPELINS IN NORTH SEA FIGHT

ESBJERG, DENMARK, Friday, June 2 (via London, June 3.)

Two Zeppelin dirigible balloons are reported by fishermen returning to port to-day to have been destroyed. The entire crew of one airship is said to have perished.

The *Avis Lamvig* says the fishermen report that yesterday they saw a Zeppelin in flames as the result of gunfire, and that the air vessel was destroyed at a point 40 miles off the Thyboroln Canal. The crew of this craft perished.

The *Ekstrabladt* says that fishermen arriving at Ringkjobing say they saw another Zeppelin destroyed yesterday, some miles from these waters.

LONDON, June 3.

The British fleet saw only one Zeppelin during the North Sea engagement, and it was fired on so heavily that it retired from action quickly, having been damaged badly. The opinion was expressed to The Associated Press at the Admiralty to-day that the theory that Zeppelins would be a great aid to the German fleet certainly was not borne out by Wednesday's battle.

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* See Professional Note, German Warship Design.—J. W. G.

Reports concerning the part played by the Zeppelins differ widely. One rumor is to the effect that the *Queen Mary* was sunk by a bomb dropped from a dirigible, but this report probably is without foundation.

Zeppelins, say the naval writers, gave the Germans a great advantage, enabling them to get quick wireless reports of the strength and position of that portion of the British fleet which was out, and also keeping them advised of the approach of the main fleet so that they could get away before being engaged by a superior force.—*New York Times*, 3/6.

LONDON, Saturday, June 3.

Six Zeppelins participated in the naval engagement off the coast of Jutland Wednesday, according to a dispatch from Copenhagen to the *Daily Mail*.

One of the dirigibles, the *L-24*, was hit several times and badly damaged, the report says, but she was able to reach the Schleswig coast after a narrow escape. Several of her men were wounded, and all her supplies had to be thrown overboard.—*New York Times*, 3/6.

The story of the British navy's battle with the German fleet off Jutland is yet to be told, observes the *Aerial Age Weekly*, but correspondents have talked with enough airmen who flew over the shell-spouting ships during the fight to know something of its aerial phases. "From these and other sources it seems certain that besides being a naval victory it was a remarkable air victory for the British. Although the Zeppelins were not prevented from serving some good purposes for their fleet, they were partly prevented from carrying out their full program. On the other hand, the British naval air service, using aerohydroplanes, was not prevented from consummating the task assigned to it. Though not succeeding in completely preventing the use of the Zeppelins as scouts radiographing back information to the hidden German fleet, the aerohydroplanes did much to hinder them. The attempt to employ Zeppelins for fire regulation was met with extremely efficient work. Specially arranged guns manned by gunners trained to shoot at aerial targets opened an effective fire, and neutral reports show that two Zeppelins were practically destroyed and that another was damaged. Covering more area than the Zeppelins, a far less number of aerohydroplanes operated from the parent ships, reporting enemy positions and the results of the gunfire."—*Army and Navy Journal*, 1/7.

PERSONAL NARRATIVES

The following personal narratives are among the most interesting and informative of any that have been received. The suggestion as to the fate of the lost battle cruisers is an interesting sequel to the veiled statements on the subject in Arthur Pollen's account.

A commander, writing in the *Weekly Dispatch*, says:

"We came upon them rather suddenly. They opened fire upon us, and never in all my life have I heard such a terrific din. The first four minutes of the battle saw most of the damage done to our big ships. I saw the *Queen Mary* and the *Indefatigable* go down. It would be wrong to say the *Queen Mary* went down; she went up. She must have taken two or three broadsides right into her, and some of the shells must have landed in the magazines, for the great vessels went up in pieces into the air. * * * *"

An officer in one of the squadron of fast battleships gives the *Times* not only some interesting facts, but mentions the time when certain phases of the battle began. He states that the fast battleships were astern of the battle cruisers, and opened fire within 10 or 20 minutes of their first shots. He writes:

"At 3.45 p. m. on May 31 'Actions Stations' were sounded off by the buglars, and this was the first indication vouchsafed to us that anything out of the common was about to take place. * * * * The guns were loaded, and then round trained the turret on to our first target, a small light

cruiser nearer to us than is healthy for such craft. 'Fire!' An eternity—and then, bang, and away goes our first salvo. The shots fell near the enemy, but she scuttled away. We let her have another salvo, then ceased fire, and turned our attention to bigger game that was now within range—the German battle cruisers. * * * * Now we all of us got going hard. The battle cruisers and ourselves against the German battle cruisers and the German High Seas fleet, which had now put in an appearance. So in spite of the stories of the Germans they were most undoubtedly considerably superior to the British force present, and remained so until the arrival of the Grand fleet some hours later. * * * * We were at this time receiving a very heavy fire indeed, our own battle cruisers having become disengaged for 20 minutes to half an hour, so that the fire of the whole German fleet was concentrated on us. Especially unpleasant was a period of half an hour, during which we were unable to see the enemy, while they could see us most clearly. Thus we were unable to fire a shot, and had to rest content with steaming through a tornado of shell fire without loosing off a gun, which was somewhat trying.

"However, about 6.30 the sun silhouetted up the Germans, and completely turned the tables as far as light was concerned, and for a period of some 20 minutes we gave them a most terrific dressing down, which we trust they will remember. Then down came the mist again, and we had to close them to four miles in the attempt to see the enemy, and four miles is, of course, about as near as one likes to get to the foe, as torpedoes then come into play. It was at this stage that, owing to some temporary defect, the *Warspite's* helm jammed, and she went straight at the enemy into a hell of fire. She looked a most wonderful sight, every gun firing for all it was worth in reply. Luckily, she got under control quickly and returned to the line, and it was this incident which gave rise to the German legend that she had been sunk."

The impressions of an officer in a torpedo-boat destroyer are given in the *Times*. After describing the battle during the afternoon, and that of the night which followed it, he writes:

"Then came the dawn—just the first sign of it—a very grey, misty morning, and out of the mist loomed up a squadron of great German dreadnoughts. Off we went with our flotillas full speed to attack, but we, being on the outer flank, missed our attack, and so on we went all by ourselves for a way, and then round again to see what we could do. We closed them and closed them, and yet they apparently could not see us. Then, bang—off went one of our torpedoes, and round we turned and gave them two more, and then they saw us and we had a 'merry hell' for a bit. However, we stuck it and watched, and then to our joy from one of their ships leaped a huge flame higher than her masts—a terrific explosion, and red-hot fragments leaped sky-high, and after that no sign of her at all, although we still saw the others. So she was done for."

An officer in one of the light cruiser squadrons states that the Germans have a habit of spreading clouds of whitish-yellow smoke, which enables their ships to maneuver without being seen.—*Naval and Military Gazette.*

How the Battle Cruisers were Sunk

By far the longest and clearest account of the kind is in the *Daily Mail* by an officer of one of the largest vessels which took part in the battle. He points out among other things that, as is bound to be the case in the present long-range fighting, the engagement was broken off from time to time because the ships lost sight of one another. Here is his tribute to the two lost admirals:

"Nothing could have been finer than the way in which Sir Robert Arbuthnot went in with his squadron, consisting of the *Defence,* the *Warrior,* and the *Black Prince,* to deliver an attack unsupported on the whole German fleet. His ship went down, but he kept practically the entire German fleet at bay for a long while, and did a tremendous amount of damage. * * * * Admiral Hood maneuvered his squadron of battle cruisers

and the procedure in special cases when compensating on one heading; appendix C, the use of azimuth tables in finding *Z*, *M*, *t*, and a great circle course; appendix D, Dr. Pesci's nomogram and its use to the navigator.

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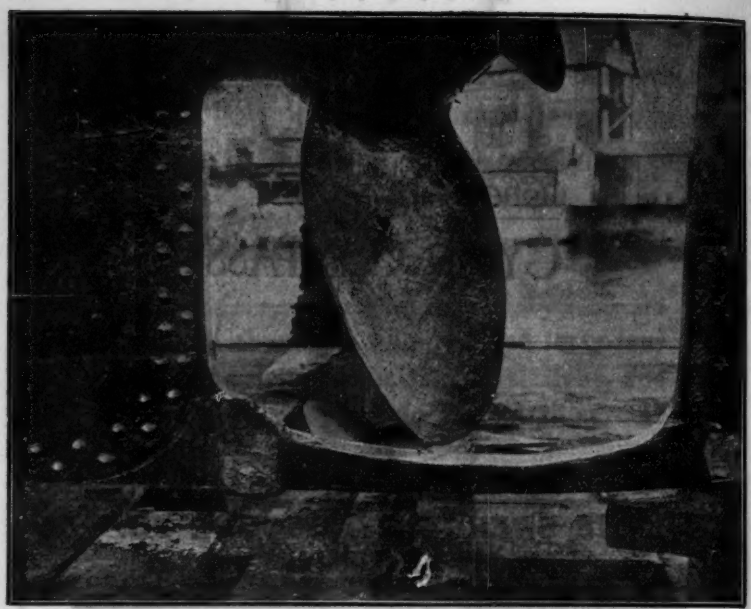

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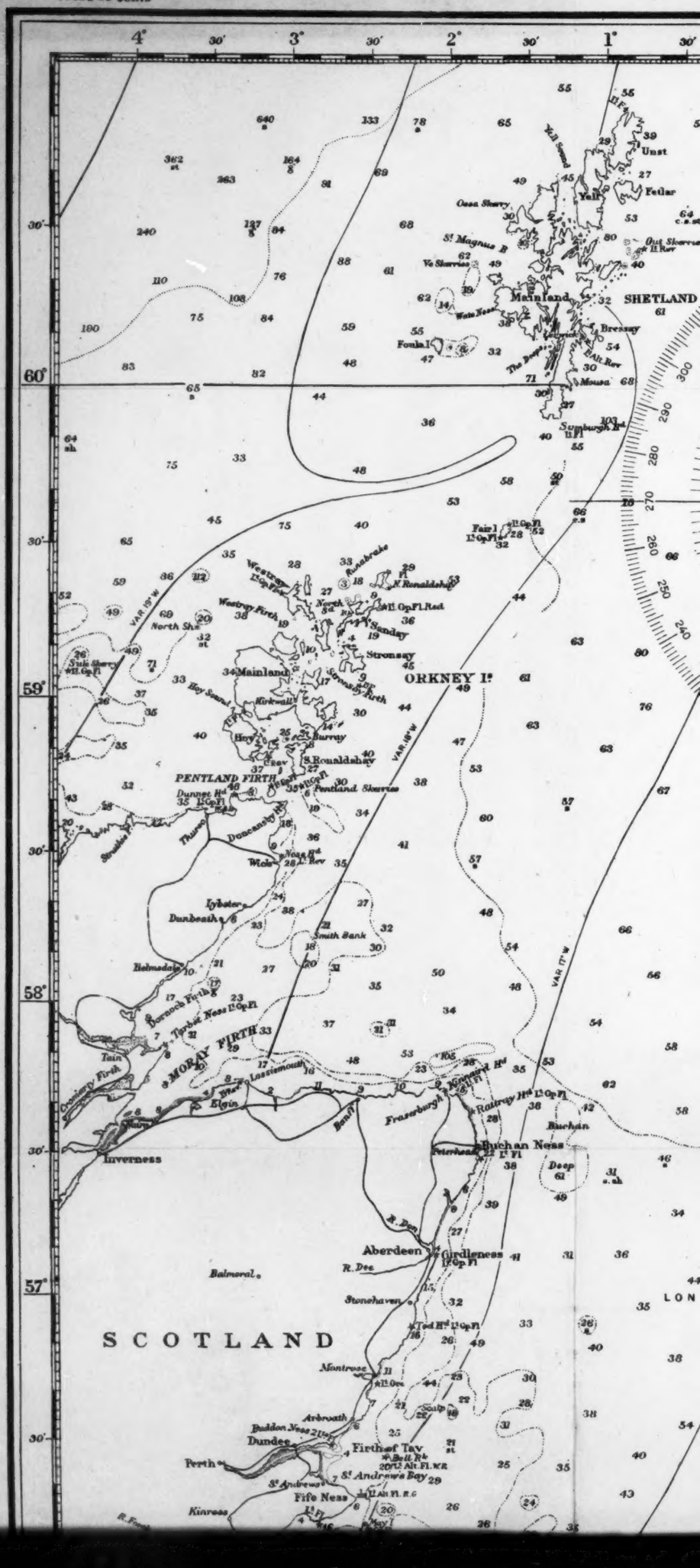

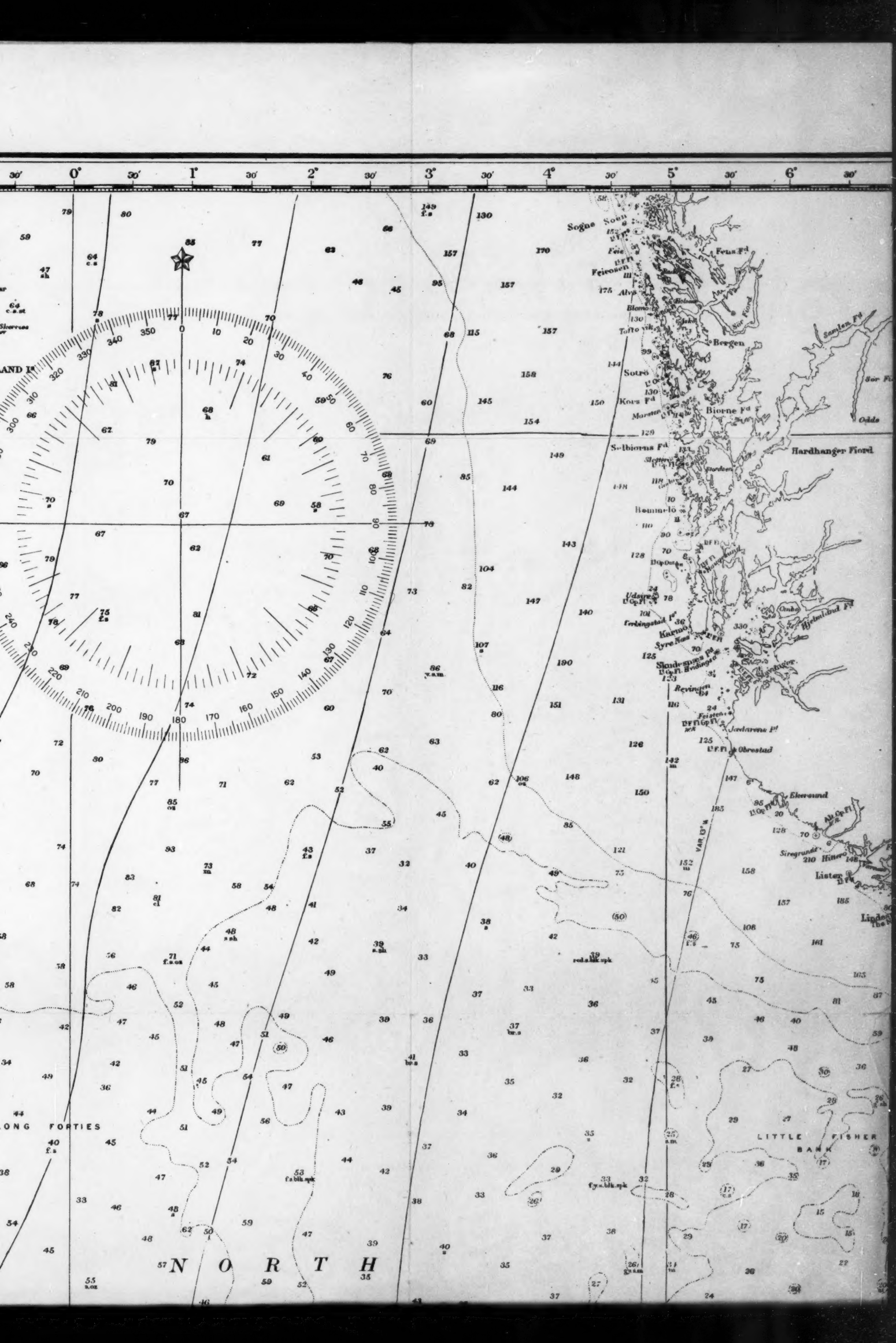
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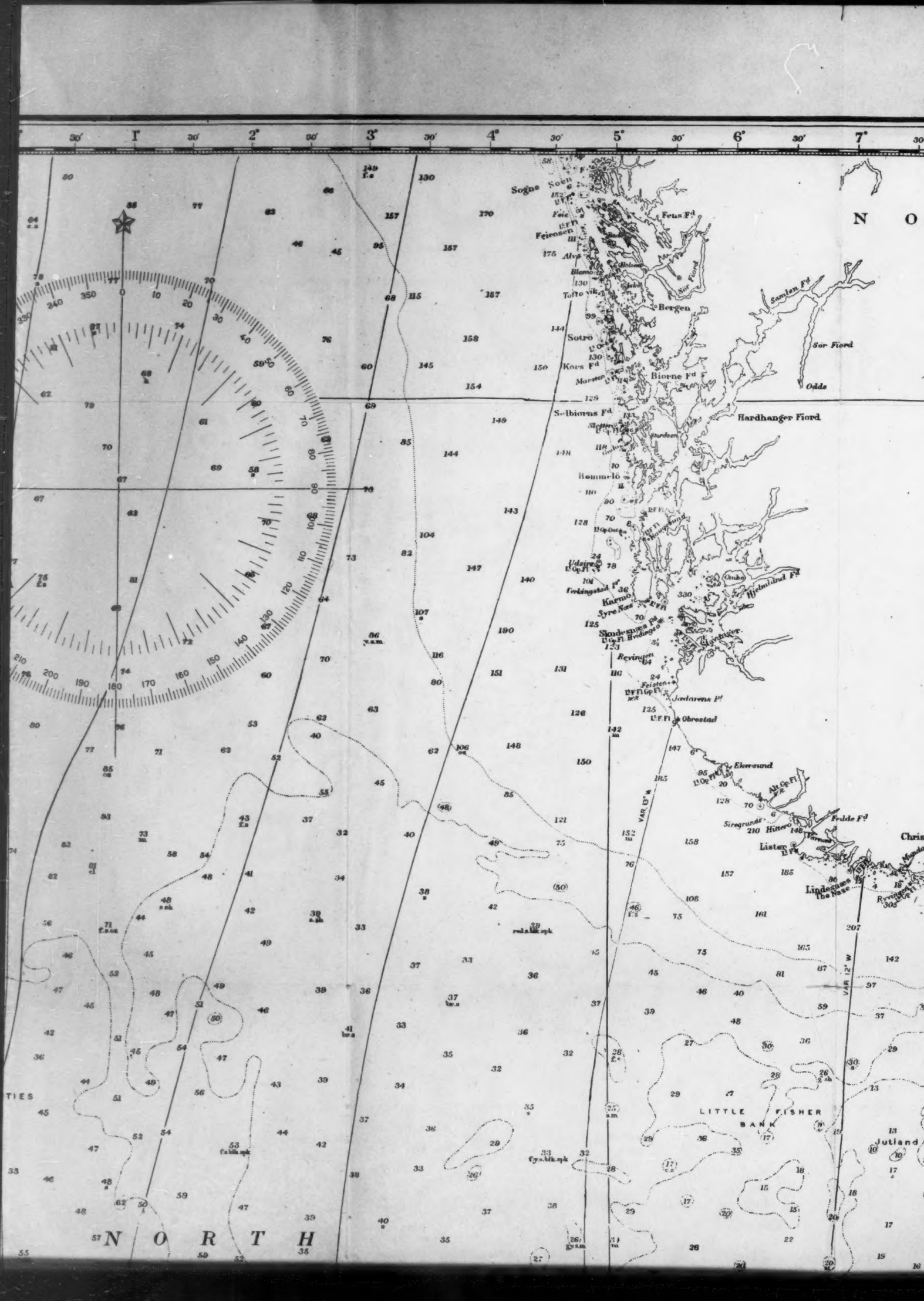
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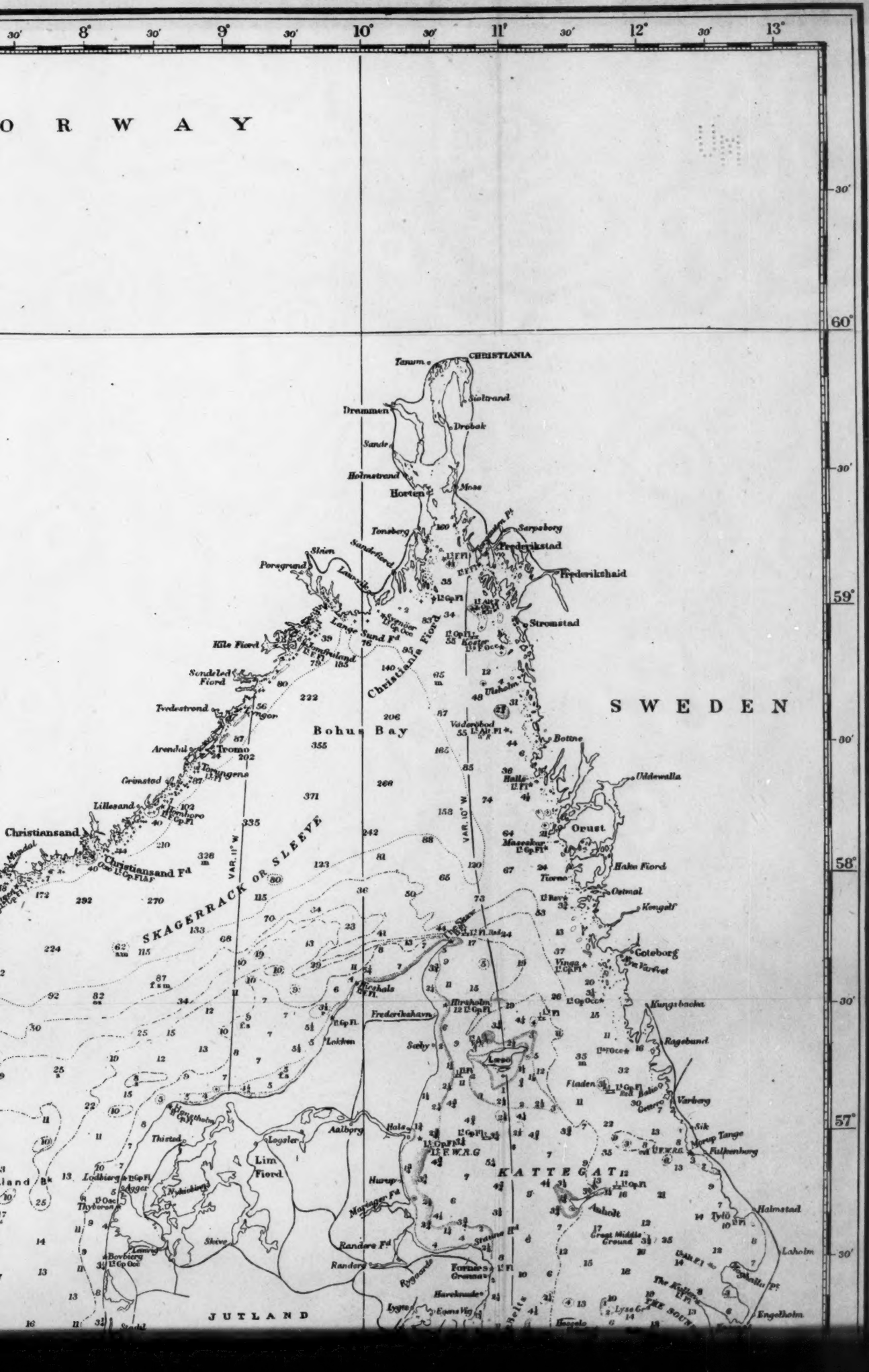
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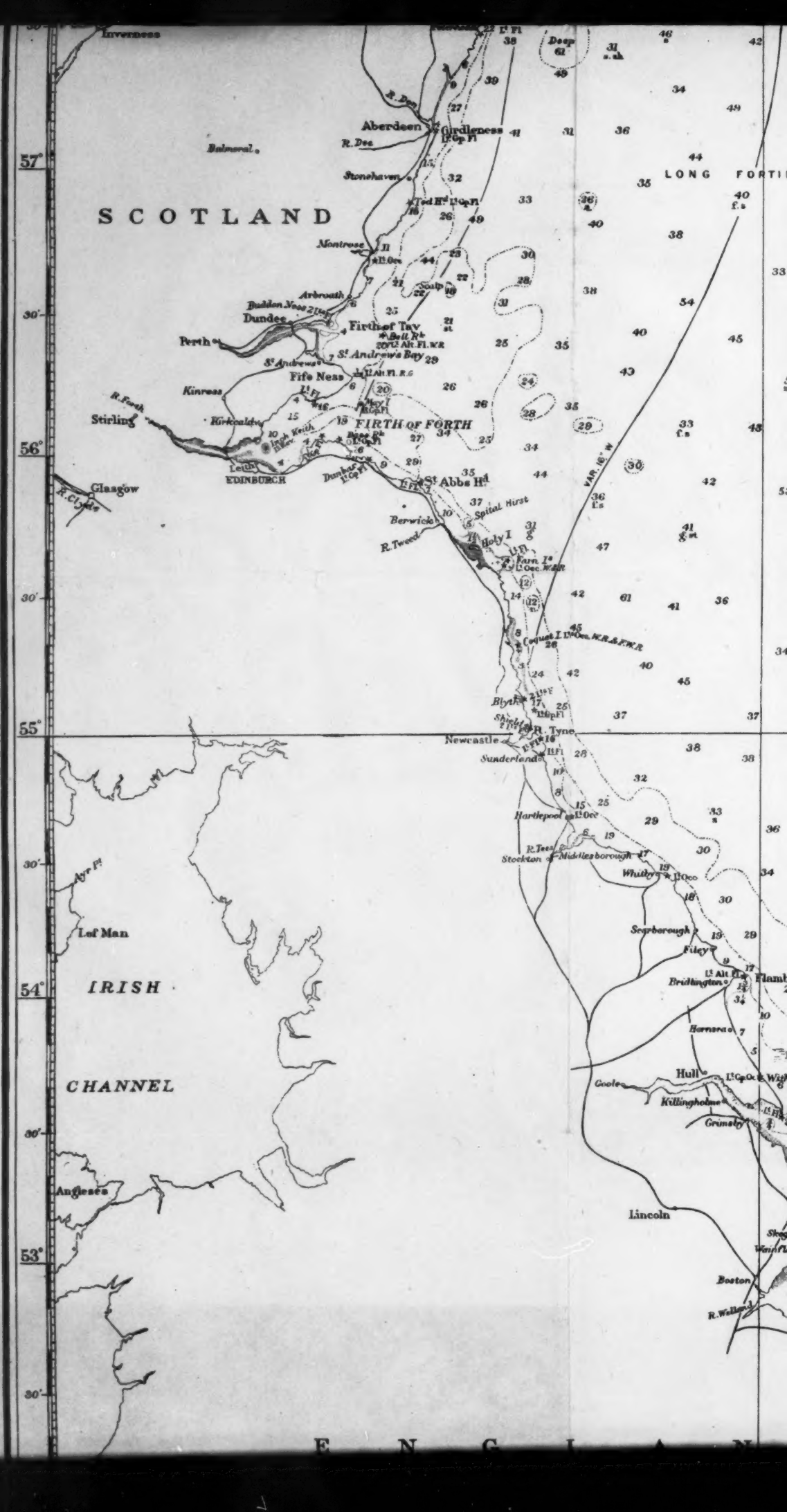
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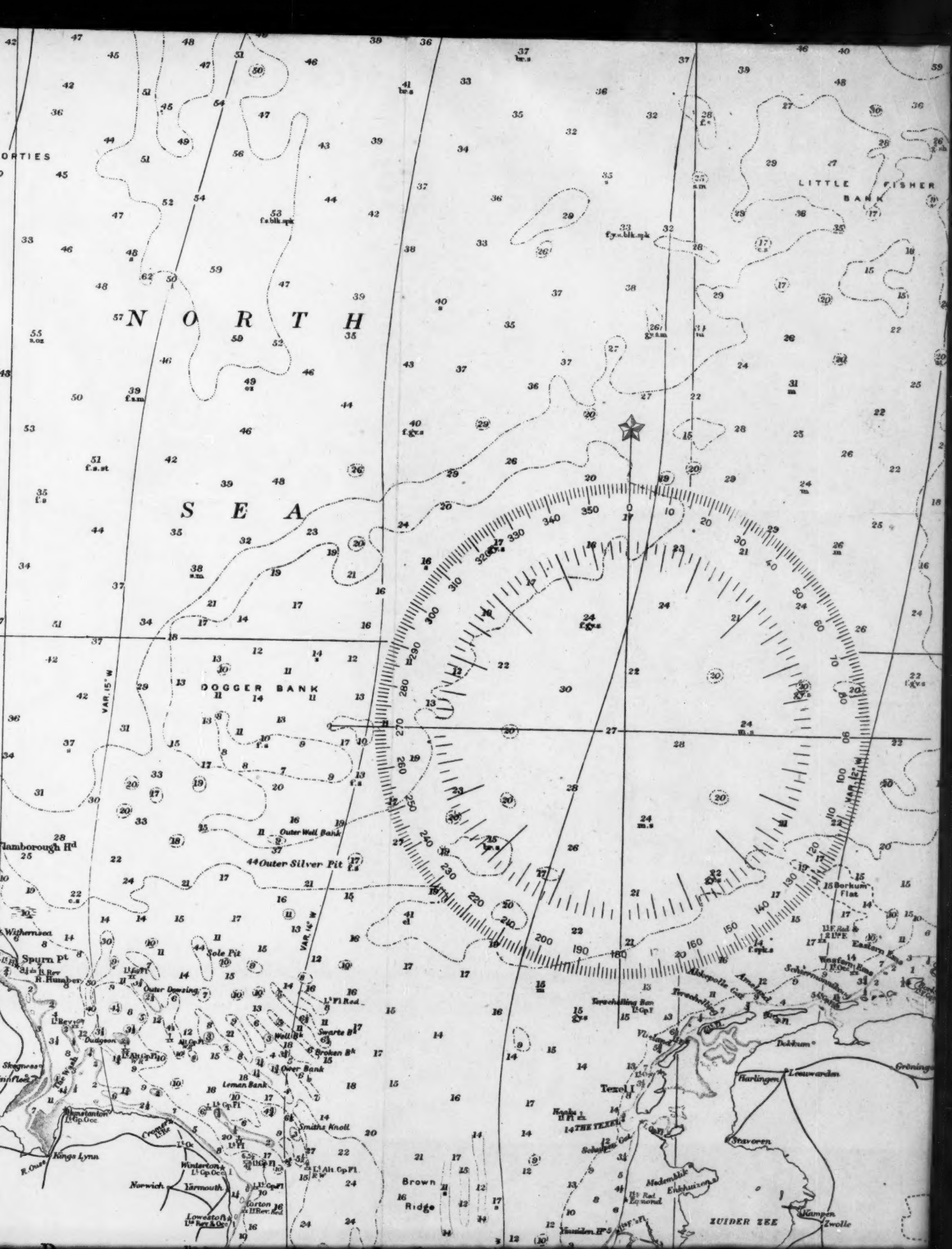
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Frederikshavn
Saby
Lokken
Kungsbacka
Ragesund
Varberg
Getteron
Sik
Morup Tange
Falkenberg
Halmstad
Tylo
Laholm
Engelholm
Hoganas
Helsingor
Helsingborg
Landskrona
Malmo
Ihalinge
Trelleborg
COPENHAGEN
Roskilde
Holbek
Kallundborg
Dalby
Kioge
Tuesley
Skudsker
Fare Rewn
C. Stevns
Fuxo B
Moen
Darsser Ort
Darsser Sill
Darnbusk
Rodby
Nyraad
Saxkjobing
Femern
Fehmarn
Grossenbrode
Heiligenhafen
Schlandorf
Schmoel
Burg
Ribnitz
Rostok
Stralsund
Wismar
Dassau
Neustadt
Bulk
Aero
Alsen
Nubel Nor
Lyster Deep
Amrum Bank
Helgoland
Elbe R.
Weser R.
Flensburg Fd
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Eider R.
Kaiser Wilhelm Canal
Ems-Jade Canal
Great Middle Ground
Drogden
The Kollen
THE SOUND
Saltholm pt
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Lysegrund
Oxlebet
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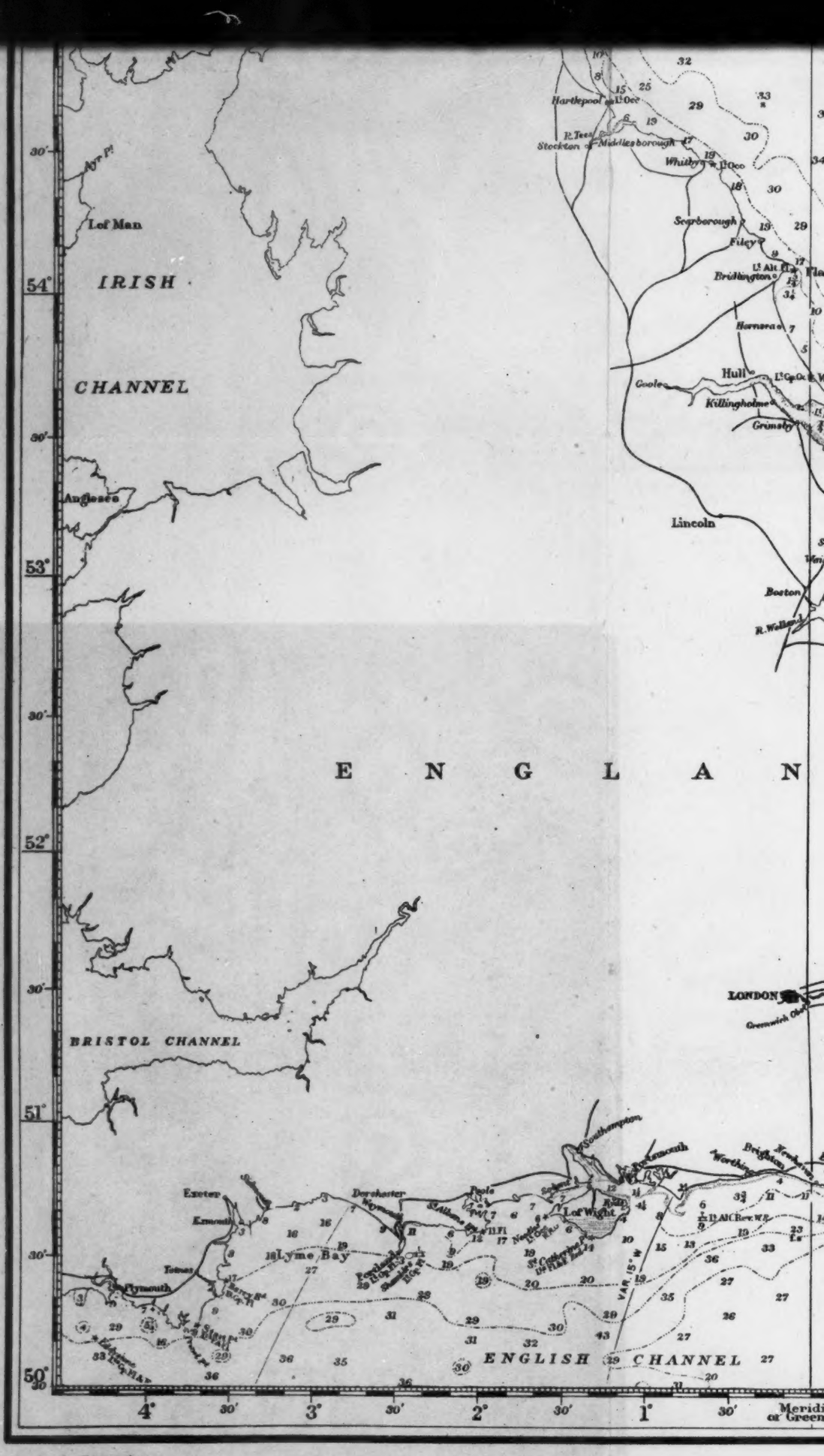
GERMAN EMPIRE



Small corrections
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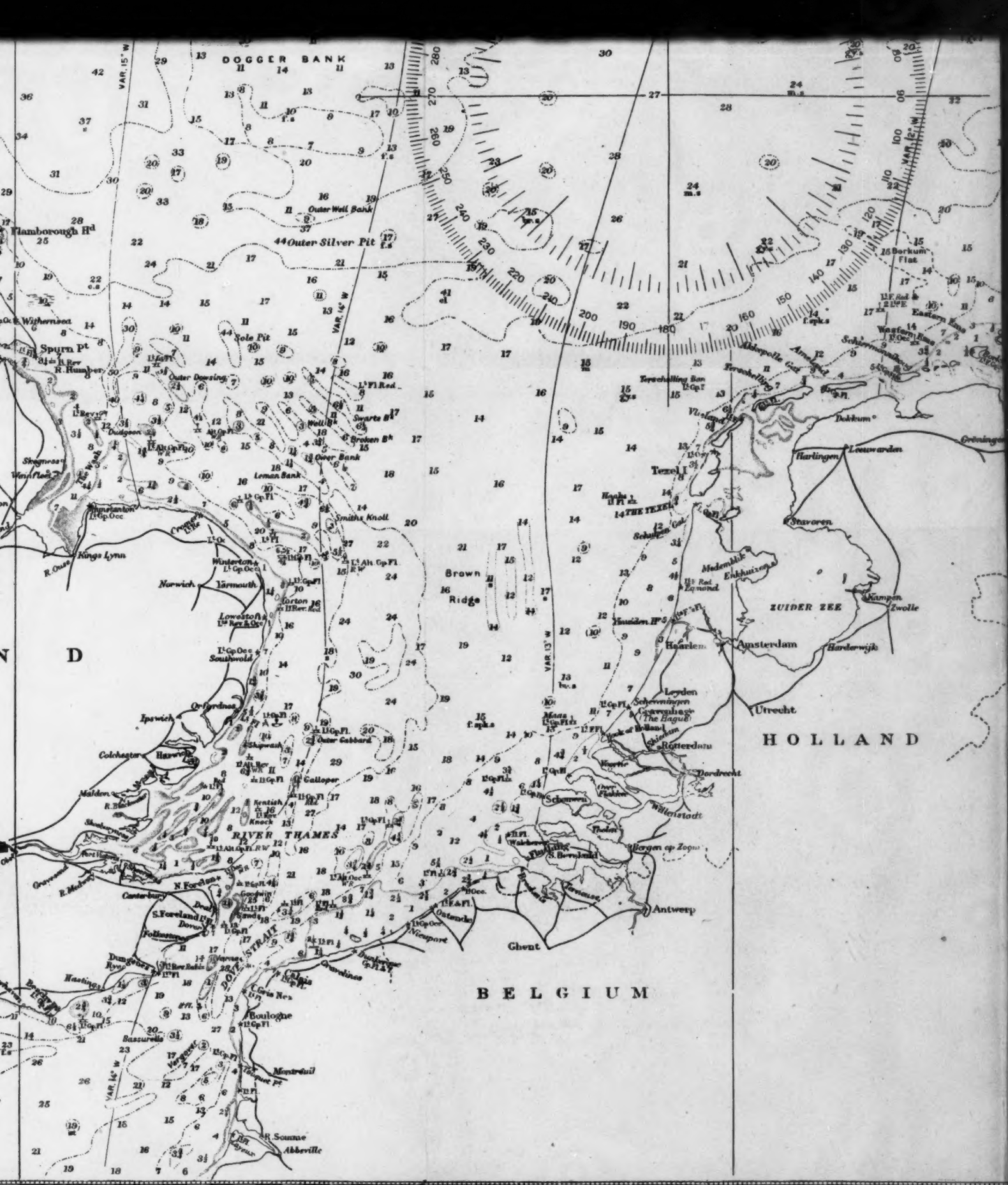

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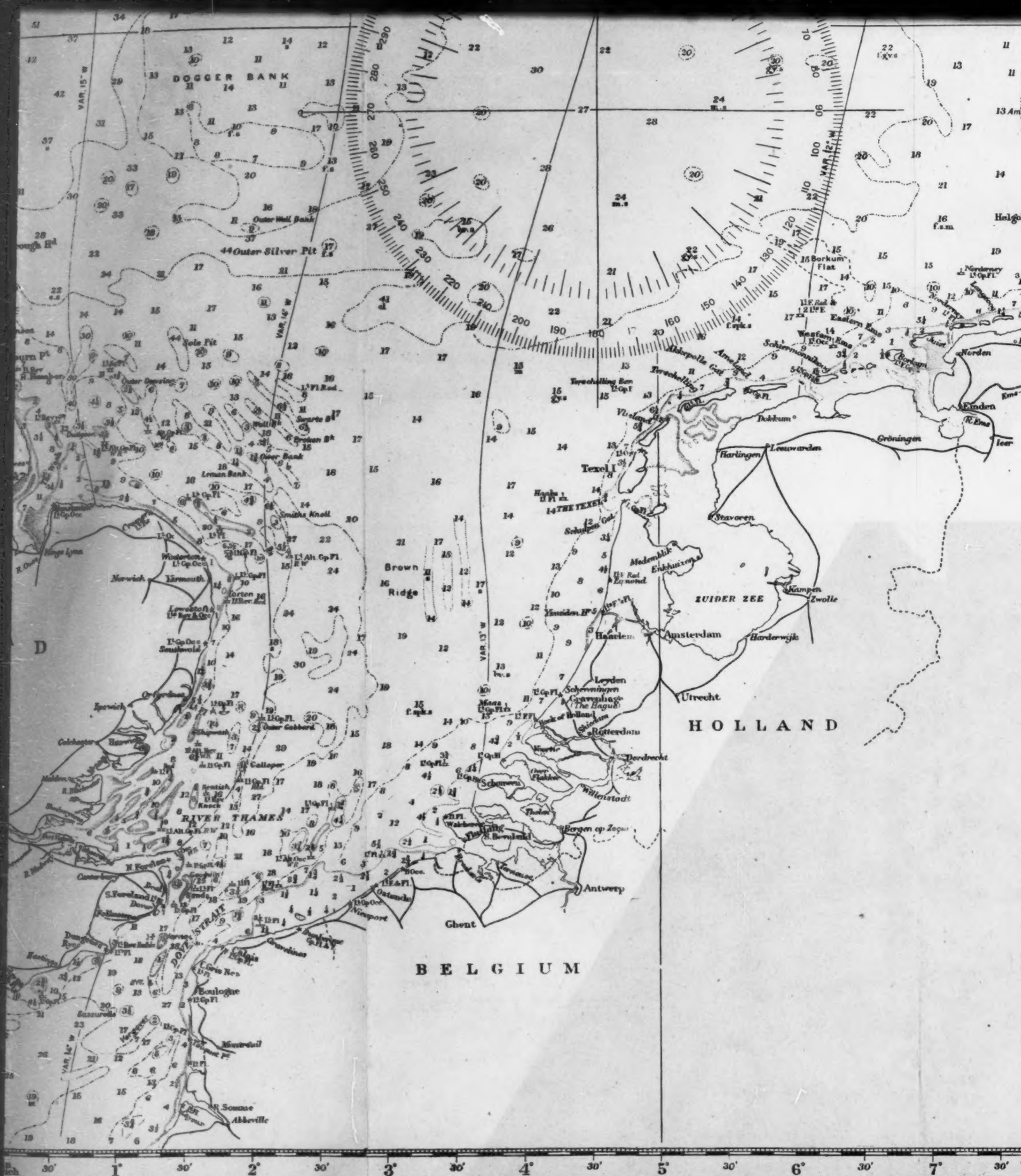

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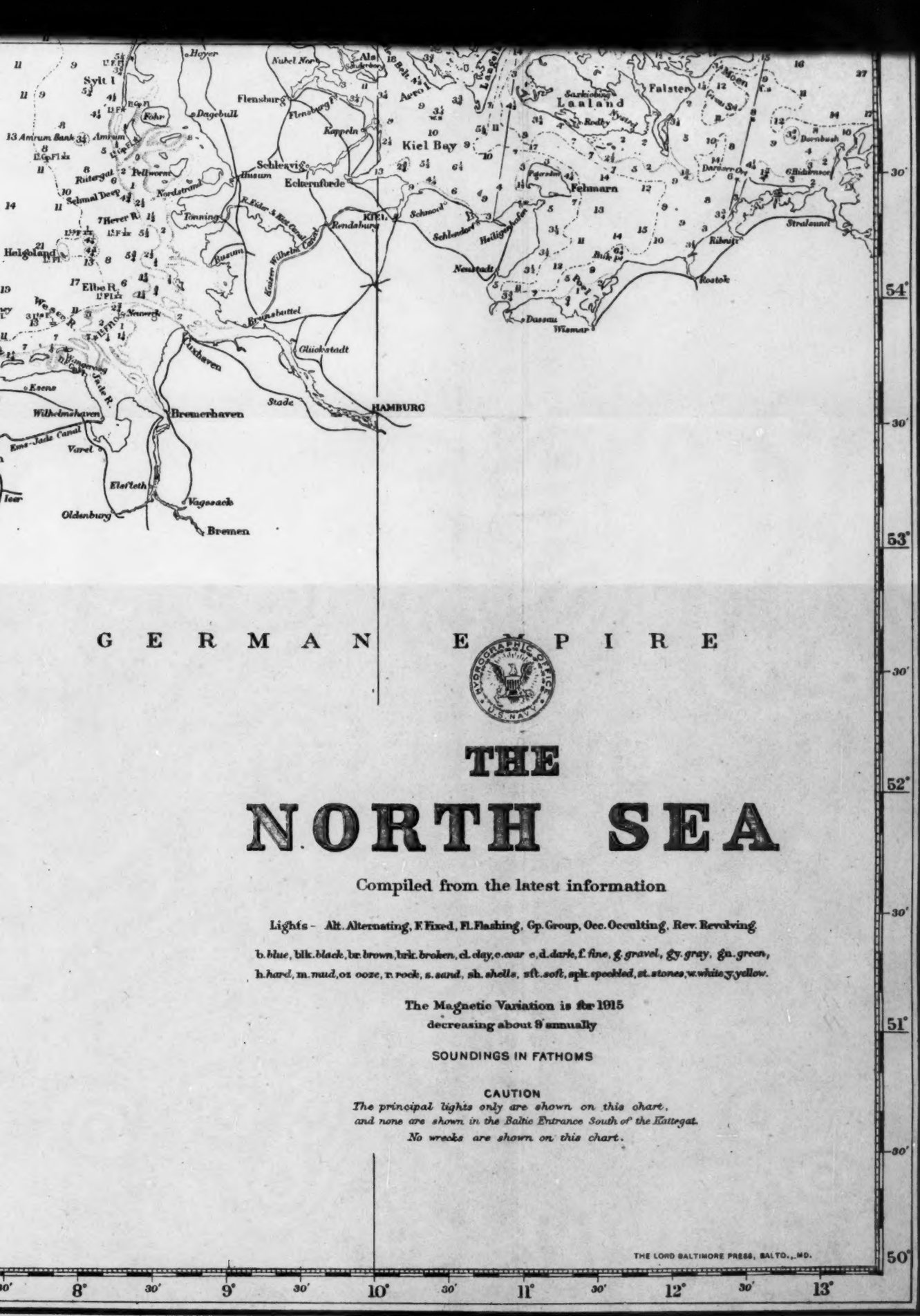

G E R M A N E M P I R E

HYDROGRAPHIC OFFICE U.S. NAVY

THE NORTH SEA

Compiled from the latest information

Lights – Alt. Alternating, F. Fixed, Fl. Flashing, Gp. Group, Occ. Occulting, Rev. Revolving

b. blue, blk. black, br. brown, brk. broken, cl. clay, c. coar c, d. dark, f. fine, g. gravel, gy. gray, gn. green, h. hard, m. mud, oz ooze, r. rock, s. sand, sh. shells, sft. soft, spk. speckled, st. stones, w. white, y. yellow.

The Magnetic Variation is for 1915
decreasing about 9' annually

SOUNDINGS IN FATHOMS

CAUTION

The principal lights only are shown on this chart,
and none are shown in the Baltic Entrance South of the Kattegat.
No wrecks are shown on this chart.

THE LORD BALTIMORE PRESS, BALTO., MD.

Price 40 cents

No. 4840

magnificently, when at half-past six in the evening they went into action, and it was really bad luck that the *Queen Mary, Indefatigable,* and *Invincible* were lost, because they were purely chance shots which brought about their destruction. The armor would have withstood any amount of shell-fire, but in each case a shell took the top off the turret and the explosion went down to the magazine, with the result that the ship blew up."—*Naval and Military Gazette.*

NORTH SEA

H. M. S. *HAMPSHIRE*

The Secretary of the Admiralty announces that the following telegram was received from the commander-in-chief of the Grand fleet:

"I have to report with great regret that H. M. S. *Hampshire* (Captain Herbert J. Savill, R. N.), with Lord Kitchener and his staff on board, was sunk last night about 8 p. m. to the west of the Orkneys either by a mine or by a torpedo.

Four boats were seen by observers on shore to leave the ship. The wind was NNW., and heavy seas were running.—*London Times,* 7/6.

A telegram received in Aberdeen last night from Kirkwall confirmed that there are 12 survivors. Several men who reached the shore died subsequently from exposure.

The vessel sank two miles from land.

* * * *

A further report has been received from the commander-in-chief of the Grand fleet regarding the loss of H. M. S. *Hampshire,* with Lord Kitchener and his staff on board.

It has now been established that the *Hampshire* struck a mine.

The *Hampshire* was accompanied on her voyage by two destroyers until the captain of the *Hampshire* was compelled to detach them at about 7 p. m. on account of the very heavy seas.

Lord Kitchener, on the invitation of his Imperial Majesty, had left England on a visit to Russia, and at the request of H. M. Government was to have taken the opportunity of discussing important military and financial questions.—*Naval & Military Gazette,* 14/6.

BRITISH DESTROYER SUNK IN COLLISION

LONDON, June 17.

The British destroyer *Eden* was sunk in the English Channel last night after a collision, according to an announcement made by the Official Press Bureau this afternoon.

Thirty-one members of the crew were saved. Three officers were missing.

The British destroyer *Eden* displaced 555 tons, and carried a complement of 70 men. She was 220 feet long, 23 feet beam, and 8 feet deep. She was built in 1903, and had a speed of 26 knots. The *Eden* carried four 3-inch guns, and was equipped with two 18-inch torpedo tubes.—*N. Y. Times,* 18/6.

22 WAR SHIPS AT ZEEBRUGGE

The Germans are reported to have as many as 22 torpedo-boats and destroyers at Zeebrugge, which is protected by mine fields. These little warcraft make frequent excursions to sea.—*N. Y. Herald,* 26/6.

NORTH SEA STRATEGY

MR. BALFOUR'S HINT OF CHANGES

Mr. Balfour indicates the alterations in the disposition of our squadrons on the east coast as threefold. Important forces are to be brought southwards, and presumably based upon some port which has hitherto not been made use of for this purpose. It will require no wild guess on the part of the enemy to ascertain both the composition of these forces and the harbor at which they are to be stationed. Their aerial scouts will give them all the information they require. A further deduction is obvious. As the Germans only use vessels of the highest speed for the raids, the forces to deal with them, in order to be effective, must have a similar quality, as well as a preponderance of gun-power. The weakness of this strategical change seems to lie in the substitution of squadrons in fixed positions on our own coast for the periodical sweeps which we have been officially told the battle fleet was in the habit of making through the length and breadth of the North Sea, and which had such a fruitful outcome in the early part of the war.

SUBMARINES AND MONITORS

The other new defensive measures are concerned with the use of submarines and monitors. As regards the submarines, these are lurking beasts, and so far have never proved their ability to torpedo vessels moving at high speed. Both in the Bight affair and off the Dogger Bank Sir David Beatty found no great difficulty in avoiding their attack upon the swiftly-moving battle cruisers by the use of the helm. Experience rather points to the employment of the under-water boats as a menace to the raiders when returning to their own lair, and when a reduction of speed may be necessary on entering their own minefields. Such a reduction would be the more necessary if there was a suspicion of our having laid fresh mines after they had left port and in their homeward track.

The proposed use of monitors for coast defence is the most disturbing feature of the whole scheme. These slow, unwieldy machines—which, as the official "eye-witness" at the Dardanelles said, wobbled into port, steering wildly—may as fixed floating forts act as a bait to the enemy, but it can hardly be proposed to station them in such numbers on the coast as to afford complete protection. Built to operate in shallow, tideless waters, this method of using them could have been in the mind of their designer. To employ them for defence instead of offence is directly contrary to all the generally received notions of British naval strategy.—*London Times*, 11/5.

ZEPPELINS DESTROYED

Two Zeppelins were officially reported on May 5 to have been destroyed —one, *L-7*, off the coast of Schleswig, and another, *LZ-55*, near the mouth of the Vardar, southwest of Salonika. In both cases the aircraft were brought down by the guns of our warships. No British vessel had previously, so far as was known, brought down a hostile airship. The commander-in-chief, Grand fleet, has reported that the ships which destroyed the Zeppelin were H. M. S. *Galatea* and H. M. S. *Phaeton*. The Zeppelin was apparently employed on scouting duty when she was destroyed. An additional statement from the Admiralty announced that though seriously damaged by the *Galatea* and *Phaeton*, her destruction was completed by a British submarine, commanded by Lieut. Commander F. Feilmann, R. N., which rescued seven of the Zeppelin's crew and had returned with them. She was attacked and slightly injured by a German cruiser on her return journey.—*Naval and Military Gazette*, 13/5.

ZEPPELIN REPORTED LOST

AMSTERDAM, Thursday, June 15.

A Zeppelin was destroyed in a wind storm near Chatelineau, South Belgium, Monday, according to frontier correspondents.—*N. Y. Times.*

BALTIC SEA

SUBMARINE CAMPAIGN RESUMED

The Baltic now being clear of ice, the Russo-British submarines have resumed their operations against German shipping very auspiciously. It was officially announced in the Petrograd communiqué on Monday night that "in the Baltic Sea one of our submarines sank three German steamers." As regards the larger operations understood to be pending in the Baltic, merchant ships arriving at various ports during last week-end stated that a German fleet, including several cruisers and the new battle cruiser *Von Hindenburg* had passed Fehmern, an island 50 miles east of Kiel, making for Riga. Captains of other vessels confirm the statement that the German fleet has left Kiel.—*Army and Navy Gazette*, 27/5.

SEAPLANE ATTACK ON BRITISH SUBMARINE

COPENHAGEN, June 19.

The crew of the Danish steamer *La Cour*, which arrived here to-day, report that they met a British submarine about noon yesterday in the Cattegat, between the islands of Anholt and Læsö. Two German seaplanes appeared and dropped bombs, but without hitting the submarine. The submarine then fired at the seaplanes, one of which was shot down and the other put to flight.

. . . . This is the second fight between British submarines and German seaplanes recently reported by the journal *Politiken*. On the 15th inst. it stated that a British submarine damaged and put to flight a seaplane which attacked it outside Ystad, on the southern coast of Sweden.—*London Times*.

GERMAN LOSSES IN THE BALTIC

STOCKHOLM, Wednesday.

A Narrköping newspaper report of the naval encounter which took place in the Baltic this morning states that 13 German trading vessels were coming from the north, convoyed by two or three torpedo-boats, an auxiliary cruiser, and several armed trawlers, when they were attacked by a flotilla of Russian torpedo-boat destroyers and submarines just off the land.

The German convoy was dispersed, and the merchantmen fled towards the coast. It is stated that several ships were sunk.

Further details of the naval encounter off the Swedish coast shortly after midnight on Tuesday are now to hand. A German light cruiser, the converted merchant steamer *Herman*, of Hamburg (3000 tons), armed with 6-inch guns, was sunk. Shells caused an explosion, and immediately afterwards she was struck by a torpedo. Of her complement of 90 men about 30 were saved, including the commander.

Several armed trawlers were disabled, and four or five ships of the convoy were sunk, the rest taking refuge in Swedish territorial waters. Three Swedish destroyers, which arrived soon after the beginning of the cannonading to defend their territorial waters, saw the attacking force, four Russian destroyers, going northwards after the encounter.—*London Times*, 16/6.

REPORTS OF BALTIC BATTLE

LONDON, Saturday, July 2.

A dispatch to Reuter's Telegram Company from Stockholm says that steamers which have arrived in port witnessed a battle Tuesday night 15 miles south of Landsort, south of Stockholm.

They report that a Russian squadron with a few torpedo-boats and torpedo-boat destroyers was attacked by a German fleet comprising cruisers and large warships. At the outset the Germans were unable to defeat the Russians, but eventually reinforcements were obtained and it is supposed the Russians withdrew northward.

The correspondent adds that nothing was visible from the coast of the reported battle owing to the fog, but that gunfiring was heard throughout the night, and at 6 o'clock yesterday morning a fresh and violent cannonade began.—*N. Y. Times*, 1/7.

MEDITERRANEAN SEA

U-BOAT BASES OCCUPIED BY ITALIANS

ROME, May 11.

The Stefani Agency announces the occupation by Italian forces of two points on the Cyrenaica coast near the Egyptian frontier—Mersa Moresa and the port of Bardia, or Mersa Burdi Suleiman.

This part of the coast has long served as a base for German submarines, and the extension of the Italian occupation to this district should have good results.—*London Times.*

LOSS OF THE *FANTASSIN*

A collision in the Mediterranean has proved the means of depriving our flotillas of the 453-ton *Fantassin* (30.5 knots, six 9-pounders). There are reasons to think the future destroyer policy of Rue Royale will include the building of large ocean-going craft of the English type, armed with 5.5-inch guns of short caliber, in limited number, and of swarms of 500-ton torpilleurs d'escadres, fit alike for torpedoing work, anti-submarine and anti-airship duties. Up to the present the Gallic navy has lost five destroyers proprement dits (*Mousquet, Dague, Renaudin, Branlebas,* and *Fantassin*). But happily it was, since the outbreak of hostilities, reinforced by over twice that number of up-to-date boats.

* * * *

Rear Admiral Gueydon has been made a vice admiral as a reward for his eminent services in superintending the transport from Corfu to Salonika of 150,000 Serbian troops, 40,000 horses, and an immense matériel.—*Naval and Military Record*, 21/6.

MONITOR SUNK

The Secretary of the Admiralty makes the following announcement:

A delayed telegram has now been received from Vice Admiral de Robeck which states that on the night of May 13-14 one of our small monitors, *M-30*, commanded by Lieut. Commander E. L. B. Lockyer, D. S. O., R. N., was struck by the enemy's artillery, and taking fire, was subsequently destroyed.

Two men were killed and two wounded.

This information, which appeared in the Turkish communiqué yesterday, was officially denied, as other messages had been received from the vice admiral two days after the occurrence. But as the result of further inquiry it is found that a message reporting the loss had miscarried.—*Naval and Military Record*, 24/5.

SHELL BULGAR COAST

PARIS, June 13.

A Salonika dispatch to the Radio Agency says that allied fleets are bombarding the Southern Bulgarian coast from Port Lagos to Dedeaghatch.

A HIT AT 7000 FEET

A Zeppelin was brought down while flying over Salonika Harbor.

It appeared at 2.30 a. m., and was immediately picked up by searchlights from sea and land. It was apparently at a height of 7000 feet. Plainly visible in the yellow glare, it crossed the town and was turning over the gulf

when a shell burst just above and it dived at an angle of 45 degrees towards the marshes at the mouth of the Vardar. Before it hit the ground two explosions occurred, probably of the petrol tank, lighting up the sky.

The airship now lies a wreck 15 miles along the shore of the gulf from the town and two miles inland.

LATER.

The Zeppelin was first sighted at Karasuli, and was followed with searchlights all the way to Topsin, where it turned east and flew over the town. It hung about over the harbor, and came under a crossfire from a French and English battleship.

Winged by the English ship the airship made for the mouth of the Vardar. An English destroyer patrolling was within a mile of the Zeppelin as it came down, and fired two shots while it was in the air, and one after it landed. A quarter of an hour afterwards an explosion occurred as if the crew had set it afire. The English officers who were first on the scene say that it is a complete wreck of tangled wires and stays. The airship was evidently of very large size. No bodies were found. The charts were dropped overboard and have been recovered.—*London Times*, 5/5.

A further report from Vice Admiral de Robeck announces that survivors of the crew had been found, and four officers and eight men had been made prisoners.

RAID ON TURKISH AIRSHIP BASE

LONDON.

The Official Press Bureau to-day gave out the following communication in regard to military operations in Egypt.

"A large enemy aerodrome near El Arish (on the Mediterranean. 100 miles east of the Suez Canal), enemy camps and troops were bombed by 11 British aeroplanes on Sunday. A hostile pilot was about to ascend and his aeroplane was destroyed by a down swooping raider. Seventy-six bombs were dropped. Five and probably more enemy aeroplanes were destroyed.

"Three British aeroplanes were lost. Two pilots were saved. The third, not escaping, burned his machine."—*N. Y. Herald*, 21/6.

ADRIATIC SEA

ITALIAN WARSHIPS PENETRATE DURAZZO

ROME, June 27.

Italian warships entered Durazzo roadstead the night of the 25th and sank two steamers, one of 5000 tons and the other of 3000 tons, laden with arms and munitions. The warships returned without loss to their base, notwithstanding the heavy fire of the enemy.—*N. Y. Times.*

SUBMARINE SINKS FRENCH DESTROYER

PARIS.

The Ministry of Marine announces that the Italian auxiliary cruiser *Citta di Messina* and the French torpedo-boat destroyer *Fourché* have been torpedoed in the Strait of Otranto.

The *Citta di Messina*, which was being escorted by the *Fourché*, was the first victim of the submarine. The *Fourché* later attacked the underwater boat, which submerged and disappeared. Soon afterward the *Fourché* herself was torpedoed. Almost all her crew was saved.

The *Fourché* was built in 1910 and had a gross tonnage of 734 tons. She was 246 feet long, 25 feet beam and 9½ feet depth. Her engines were of 12,330 horse-power, and her speed was 31 knots. Her armament consisted of two 4-inch guns, four 9-pounders and four 18-inch torpedo-tubes in pairs.

The *Citta di Messina* was a vessel of 3495 tons, owned by the Italian State Railways and built at Sestri Ponente in 1910. She was 363 feet long, 42 feet beam and had a depth of 27 feet.—*N. Y. Herald*, 26/6.

EXTENSIVE AIR RAID

On the 5th, six of our *Caproni* aeroplanes bombarded the railway station of Mattarello, in the Adige Valley. Yesterday a squadron of 37 *Caproni*s and *Farmans* dropped 160 bombs and 60,000 arrows on enemy encampments north of Asiago and in the Nos Valley. The whole squadron returned safely. Two hostile machines were brought down.—*N. Y. Times*, 18/6.

BLACK SEA

TURKISH SHIPS BUSY

CONSTANTINOPLE, July 5.

An official report, issued by the War Office, says:

"At 4 o'clock on Tuesday afternoon the enemy ship *Reben* (*Göben*) bombarded the town and port of Tournse and sank the passenger steamer *Knias Obolensku*. At the same time the *Breslau* bombarded Sotchy."—*N. Y. Times*.

SINK 54 TURKISH CRAFT

PETROGRAD, July 3.

Russian torpedo-boats destroyed 54 enemy sailing vessels in the Black Sea near the Anatolian coast on June 29, says an official statement.—*N. Y. Times*.

SHIP WITH 800 ABOARD SINKS

PETROGRAD, June 23.

The loss of life on the Steamer *Mercury*, which was sunk by a mine in the Black Sea, has been undoubtedly large, from late reports received in regard to the disaster.

The *Mercury* was travelling from Odessa to Kherson, with 800 passengers. The vessel struck the mine 13 miles from Odessa and two miles off shore in a rough sea. The bow was blown off and the ship sank in five minutes. Only two lifeboats were launched and both, laden with passengers, were overturned.

MAJORITY ARE SAVED

Thirteen boats, which were sent to the rescue, were unable to approach the scene, owing to the heavy sea, but succeeded in rescuing passengers who were strong swimmers or who floated to them on fragments of wreckage. In this way a majority of the passengers were saved, but a large number are unaccounted for. Twenty-eight bodies have been washed ashore.

The disaster was witnessed by the captain of a Russian steamer, who, however, did not attempt to come to the rescue because he believed that the ship had been torpedoed and that his own vessel would suffer the same fate. —*Washington Star*, 23/6.

MISCELLANEOUS

MINES IN SWEDISH WATERS

A Gothenburg newspaper announces that since the beginning of the war 625 mines have been rendered harmless in Swedish waters. The statistics show that the waters around Gothland are the most dangerous; after them come the coast of Bohustoer and the approaches to Stockholm and Blekinge. Seafarers are urgently warned to avoid the line through Gotska Sandoen, Almagrund, Huvudskaer, as it has been learned that the Germans have long intended to lay mines there, although no official German intimation to this effect has been issued.—*Shipping Illustrated*.

2200 GERMANS AID TURKISH CAMPAIGN

CONSTANTINOPLE, May 30.

For the first time since the war began the full facts are now made known as to the number, and nature of service, of the German officers and men in the Ottoman Army. At the present time 360 officers and 1867 non-commissioned officers and men of German origin are serving with the Turkish Army, navy, and coast defence system.

Of this number, 253 officers and 517 non-commissioned officers are attached to the mobile army and interior fortifications; while 107 officers and 1350 non-commissioned officers and men serve in the Ottoman Navy and the coast batteries.

In the coast defence organization of the Dardanelles German officers were active. Most of them came from the reserves of the German Navy. Though the service, resembling in the main the coast defence troops of the United States in organization, was headed by Djemal Pasha, the man actually in command was Great Admiral von Usedom Pasha, a close friend of the German Emperor.—*N. Y. Times*, 19/6.

CONTROL OF ITALIAN SHIPPING

ROME, May 21.

The Commission of Control of Maritime Traffic appointed last February has published a statement regarding the work done during the first three months of its existence.

Seventy-five per cent of the Italian cargo steamers have been requisitioned on behalf of various departments of the government, and the remaining 25 per cent, which are also under the control of the commission, have been detailed to furnish supplies for the factories which have been taken over by the government for the manufacture of munitions, or, in the case of smaller ships, have been employed for the importation of phosphates. Passenger ships have been taken over at reduced freights for the import of grain and other necessaries.

The commission is also making use of sailing ships of adequate tonnage principally for the import of coal. These ships are managed by the owners on behalf of the commission and are paid requisition rates. So far 87 sailing ships, of a total tonnage of 150,000, have been put on the list by the commission.—*London Times.*

KARLSRUHE AIR RAID

BERLIN, June 26.

A report on the aeroplane raid on Karlsruhe on June 22 shows that 110 persons, including five women and 75 children, were killed, and 147 persons injured, including 20 women and 79 children.

The French official communication issued on the night of June 22, said that in reprisal for successive bombardments carried out by the Germans on the open towns of Bar-le-Duc and Lunéville, French aerial squadrons had bombed Treves and Karlsruhe. A flotilla of nine aeroplanes had dropped 40 shells on Karlsruhe, the statement said.

ESCAPES FROM SUBMARINES

The lucky escape of the 7000-ton liner *Colbert*, of the Compagnie Havraise Peninsulaire, which has just arrived in Marseilles much damaged through gunfire, confirms the lessons of other Gallic mailboats which recently foiled the efforts of Mediterranean pirates. Given adequate speed, skilful maneuvering, and one or two efficiently-manned quick-firers on board, the position of a merchant ship pursued by one of those fast and well-armed German submersibles of the latest types is far from being so desperate as is sometimes imagined, especially since Mediterranean routes are being

patrolled by numerous Franco-British auxiliary flotillas, thoroughly familiarized with the police work entrusted to them, and ever ready to promptly answer wireless calls. The *Colbert* was fired upon at long range, which three hours of pursuit and cannonade gradually reduced to some 3000 meters. Mounting only a small quick-firer aft, and being hardly good for 13 knots, she would probably have fallen a victim to the pirate but for the timely arrival of a handy chalutier, which frightened off "l'assassin de la mer." The latter is described as a "croiseur-sousmarin" of some 100 meters length and 17 knot speed, with a huge central armored tower and two 4.1-inch guns in turrets, that appeared to have been skilfully handled, thus a relatively formidable opponent, and hardly vulnerable to small quick-firers from her apparently armored upper works.—*Naval and Military Record*, 3/5.

MESOPOTAMIAN NAVAL OPERATIONS

In Sir John Nixon's dispatch, describing the operations in Mesopotamia up to the time of his relief, the work of the naval flotilla on the Tigris is several times referred to. It is officially revealed that the so-called monitor abandoned by the British in November last was the gunboat *Shaitan*, which, after running aground about eight miles above Azizie, could not be refloated. The gunboats also which the Turks called the *Kemed* and *Firikless* are identified as the *Comet* and *Firefly*, two vessels which, after their guns had been rendered useless, were abandoned in December. The *Sumana*, an armed tug, was the only vessel left at Kut, and presumably was destroyed before the capitulation. The *Shushan* is also mentioned, but Sir John Nixon does not say what became of her. The difficulties of navigation in the Tigris, by reason of the routes and twists in the river and the numerous sandbanks, receive eloquent witness in these dispatches.—*Naval and Military Gazette*, 27/5.

BRITISH TAXATION AND THE WAR

According to an article by J. A. R. Marriott in the May *Nineteenth Century and After*, Great Britain has imposed additional war taxation amounting to about 300,000,000 *l.* a year, as compared with 24,000,000 *l.* levied by Germany. The British national debt, 651,000,000 *l.* ($3,000,000,000) at the beginning of the war, will at the close of the present fiscal year, March 31, 1917, approximate 2,640,000,000 *l.* ($13,000,000,000), or about five times the national revenue. Proof that the country is able to bear the strain is found in the fact that the revenue for 1916-17 is estimated to exceed that for 1915-16 by 173,000,000 *l.*, which is nearly 100,000,000 *l.* more than is required to pay the additional interest. The government's policy is: "Never borrow one pound without making provision by new taxation sufficient to cover both interest and a liberal sinking fund."

The "War of American Secession" cost England 97,500,000 *l.*, of which only 3,000,000 *l.* was paid at the time; about 831,000,000 *l.* was spent during the Napoleonic wars, of which 47 per cent was paid out of the current revenue; in the persent war the current revenue pays about 17 per cent. In 1916-17, 72 per cent of this will be raised by direct taxation. It is remarked that the cost of the war thus falls largely on the wealthier classes, whereas with the advance of democracy these classes have lost most of their political power and responsibility. Financial and political responsibility are thus in dangerous separation.

MINE SANK THE "SEACONNET"

LONDON, Wednesday.

The metal fragments from the hull of the American steamship *Seaconnet*, which was run ashore on the Scrob sands on Sunday after having been damaged by an exterior explosion, have been examined by the naval exports at the American Embassy, and the general impression is that they are parts

of a mine. The reports of the naval attachés will be communicated to the State Department.

The *Seaconnet* has been abandoned by the salvage operators and declared a total loss.—*N. Y. Herald, 22/6.*

DUTCH BATTLESHIP CREWS MUTINY

AMSTERDAM, May 11.

The *Telegraaf* learns from Weltevreden, Java, that a mutiny has occurred in the Dutch battleships the *Seven Provinces, Koningin Regentes,* and *Tromp*. The outbreak was most serious in the *Seven Provinces,* in which 60 men were punished.

The ships' captains refused to negotiate with the mutineers, and all leave was cancelled.

Three hundred deserters refused to return to the vessels and remained in the streets, which are being patrolled by soldiers. Discontent is supposed to have been the cause of the mutiny.—*London Times.*

PATROL FLEET TO MEXICO

A naval force quite sufficient to patrol the two coasts of Mexico and prevent General Carranza from importing arms and ammunition from other countries has been ordered to Mexican waters. As a matter of fact there is little opportunity for Carranza to get munitions from other countries, but a strong patrol is nevertheless necessary.—*Herald,* 19/6.

CHINESE NAVY REBELLIOUS

SHANGHAI, June 26.

That part of the naval forces of China concentrated at Wu-sung, on the river 10 miles north of Shanghai, has issued a declaration that it will not obey the orders of the Navy Department until the Nanking Constitution is restored, Parliament reconvened, and a "legitimate Cabinet" appointed. The naval men declare their allegiance to President Li Yuan-hung, but state that he has no freedom of word or act, and that China is a republic in name only, ruled by despotic militarists.

This is the first visible sign of an attempt in the southern provinces to overthrow the Cabinet of Premier Tuan Chi-jui with a view to the eventual recall of Tang Shao-yi to the premiership. The struggle thus initiated is one of the new bureaucrats against the democrats.—*N. Y. Times.*

U-BOAT TO SPAIN

CARTAGENA, SPAIN, June 22.

The German submarine *U-35,* commanded by Lieutenant von Arnauld, arrived here yesterday with a letter from Emperor William to King Alfonso.

The submarine first anchored alongside the interned German steamship *Roma,* but the port authorities required her to move and take up anchorage near the Spanish cruiser *Cataluna.*

The Secretary of the German Embassy arrived here on a special train late last night for the purpose of receiving the letter. Accompanied by the German Consul he went on board the submarine and visited the commander. A Spanish cruiser and a destroyer received orders to watch closely the movements of the submarine. Instructions were given to keep the entrances to the harbor lighted brightly with searchlights.

The German submarine departed from this port shortly before daylight.

MADRID, June 22 (via Paris).

The arrival of the German submarine *U-35* at Cartagena was officially confirmed. The submarine anchored alongside the Spanish cruiser *Cataluna.* The Secretary of the German Embassy at Madrid has left for Cartagena to

receive an autograph letter from the German Emperor to King Alfonso, supposed to be thanks for a reception given interned Germans from the *Kamerunn*.

The section of the press which favors the German side in the war publishes articles to-day eulogizing the German sailors for their naval exploits. The submarine came from Pola, the Austrian naval base.

The newspaper *Pais* says the diplomatic representatives of certain foreign countries have asked the Spanish Government for further particulars in regard to the visit of the *U-35*.

As the *U-35* left Cartagena her crew gave cheers for Spain. The vessel was accompanied beyond Spanish waters by Spanish destroyers, as it was reported Allied warships were waiting for her.—*N. Y. Times.*

TABLE OF NAVAL LOSSES OF THE VARIOUS BELLIGERENTS SINCE THE OUTBREAK OF WAR

The following table is compiled from various articles appearing in the press of the several belligerent nations. These reports are so contradictory that it is impossible to furnish an absolutely correct list of vessels lost to date. In many cases the belligerent powers have failed to acknowledge the losses of all the vessels. No attempt has been made to include herein a list of the various trawlers, mine-sweepers and such odd small craft which may have been destroyed while mine-sweeping or on submarine patrol duty.

(On the left margin of this table of losses is a reference to the whole number in which an account of the loss is given. A page index of these losses is given in the whole number referred to.

ABBREVIATIONS FOR TYPE OF VESSEL

Dreadnought battleship	d. b.	Torpedoboat	t. b.
Battleship	b.	Submarine	sm.
Battle cruiser	b. c.	Auxiliary cruiser	ax. c.
Armored cruiser	a. c.	Transport	tr.
Protected cruiser	p. c.	Minelayer	m. l.
Cruiser	c.	Coast guard	c. g.
Light cruiser	l. c.	Hospital ship	h. s.
Gunboat	g. b.	Training ship	tr. s.
Torpedo gunboat	t. g.	Patrol boat	p. b.
Monitor	m.	Armed merchant vessel	a. m. v.
River monitor	r. m.	Yacht	y.
Flotilla leader	f. l.	Naval tender	n. t.
Destroyer	d.		

LOSSES OF GREAT BRITAIN AND HER ALLIES

BRITISH WARSHIP LOSSES

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
154, 155, 156	Audacious	d. b.	24,000	Reported sunk off Irish coast. Cause unknown. British Admiralty, non-committal	29-10-14
155	Bulwark	b.	15,000	Internal explosion at anchor in the Thames	25-11-14
156	Formidable	b.	15,000	Sunk by German sm., North Sea	1- 1-15
156	Irresistible	b.	15,000	Sunk in the Dardanelles	18- 3-15
156	Ocean	b.	12,950	Sunk in the Dardanelles	18- 3-15
161, 162	King Edward VII	b.	16,350	By mine, North Sea	9- 1-16
158	Goliath	b.	12,950	Torpedoed in Dardanelles	12- 5-15
158, 161	Triumph	b.	11,800	Sunk by sm., Dardanelles	25- 5-15
158	Majestic	b.	14,900	Sunk by sm., Dardanelles	27- 5-15
163, 164	Russel	b.	14,000	Sunk by mine, Mediterranean	26- 4-16
164	Queen Mary	b. c.	27,000	Sunk by gunfire, battle of Jutland	31- 5-16
164	Indefatigable	b. c.	18,750	Sunk by gunfire, battle of Jutland	31- 5-16
164	Invincible	b. c.	17,250	Sunk by gunfire, battle of Jutland	31- 5-16
161, 162	Natal	a. c.	13,360	Internal explosion and sunk at anchor	30-12-15
153	Warrior	a. c.	13,550	By mine	5- 9-14
154	Hogue	a. c.	12,000	Sunk by German sm. U-29, North Sea	22- 9-14
154	Cressey	a. c.	12,000	Sunk by German sm. U-29, North Sea	22- 9-14
154	Aboukir	a. c.	12,000	Sunk by German sm. U-29, North Sea	22- 9-14
154	Hawke	a. c.	7,350	Sunk by German sm. U-9, North Sea	16-10-14
154, 155	Good Hope	a. c.	14,100	Sunk by German forces in Pacific	1-11-14
154, 155	Monmouth	a. c.	9,800	Sunk by German forces in Pacific	1-11-14
160	Argyll	a. c.	10,850	Ran aground, east coast of Scotland	28-10-15
164	Defense	a. c.	14,600	Sunk by gunfire, battle of Jutland	31- 5-16
164	Black Prince	a. c.	13,550	Sunk by gunfire, battle of Jutland	31- 5-16
154	Warrior	a. c.	13,550	Sunk by gunfire, battle of Jutland	31- 5-16
164	Hampshire	p. c.	10,850	Sunk by mine, off Orkneys	6- 6-16
153, 155	Pathfinder	l. c.	2,940	Sunk by German sm., North Sea	5- 9-14

BRITISH WARSHIP LOSSES—Continued

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
153	Amphion	l. c.	3,360	Sunk by mine, North Sea	6- 8-14
153	Pegasus	l. c.	2,135	Sunk by German c. Koenigsberg at Zanzibar	20- 9-14
162	Arethusa	l. c.	3,750	By mine off east coast of England	14- 2-16
155	Hermes	l. c.	5,600	Sunk by German sm. U-27, North Sea	30-10-14
163	Penelope	l. c.	3,600	Reported damaged beyond repair, attack on Hovestoft	25- 4-16
153	Speedy	t. g.	810	Sunk by mine, North Sea	3- 9-14
134, 155	Niger	t. g.	810	Sunk by German sm. while at anchor	11-11-14
164	M-30	m.	——	Sunk by Turkish gunfire, Gulf of Smyrna	13- 5-16
164	Tipperary	f. l.	1,900?	Sunk by gunfire, battle of Jutland	31- 5-16
	Bullfinch	d.	370	Sunk in collision with Dutch merchant ship	18- 8-14
	——	d.	——	Ran ashore, Scotch coast	27-12-14
	Erne	d.	550	Wrecked in a storm	- 2-15
157, 158	Recruit	d.	385	Sunk by German sm., North Sea	1- 5-15
157, 158	Maori	d.	1,035	Blown up by mine off Belgian coast	7- 5-15
159	Lynx	d.	935	Sunk by mine	10- 8-15
161	Louis	d.	965	Wrecked, Eastern Mediterranean	10-11-15
162	Coquette	d.	365	Sunk by mine, North Sea	?- 3-16
164	Fortune	d.	920	Sunk by gunfire, battle of Jutland	31- 5-16
164	Sparrowhawk	d.	950	Sunk by gunfire, battle of Jutland	31- 5-16
164	Ardent	d.	950	Sunk by gunfire, battle of Jutland	31- 5-16
164	Shark	d.	950	Sunk by gunfire, battle of Jutland	31- 5-16
164	Eden	d.	555	Sunk after collision, English Channel	16- 6-16
158	No. 10	t. b.	244	Sunk by German sm., North Sea	10- 6-15
158	No. 12	t. b.	253	Sunk by German sm., North Sea	10- 6-15
160	No. 96	t. b.	130	Sank after collision with merchantman, Straits of Gibraltar	1-11-15
162	No. 11	t. b.	253	Sunk by mine, North Sea	?- 3-16
153	AE-1	sm.	725-810	Accidentally sunk off Australian coast	14- 9-14
154	E-3	sm.	725-810	Rammed and sunk by German vessel	18-10-14
154, 155	D-5	sm.	550-600	Sunk by German mine, North Sea	3-11-14
	D-2	sm.	550-600	Reported lost. Details not known	1-12-14
	E-10	sm.	725-810	Missing, North Sea	
157	E-15	sm.	725-810	Ran aground in the Dardanelles and destroyed by own picket boats	17- 4-15
162	——	sm.	——	Stranded, Dutch coast	6- 1-16
162	E-17	sm.	725-810	Reported as sunk off Holland	6- 1-16
159, 160	AE-2	sm.	725-810	Sunk, Sea of Marmora	30- 4-15
	E-13	sm.	725-810	Sunk by German torpedo craft off Danish coast	19- 8-15
160	E-7	sm.	725-810	Sunk at Dardanelles	4- 9-15
160, 161	E-20	sm.	——	Announced as sunk by Turks in Dardanelles	5-11-15
163	E-22	sm.	——	Sunk off Holland	6- 1-16
154	Oceanic	ax. c.	17,274	Ran aground off north coast of Scotland in storm	8- 9-14
162, 163	Alcantara	ax. c.	15,300	Sunk in battle, North Sea	29- 2-16
	Rohilla	ax. c.	7,400	Ran aground off Whitby, completely wrecked	30-10-14
156	Viknor	ax. c.	5,386	Lost off Irish coast	14- 1-15
	Clan Macnaughton	ax. c.	4,985	Lost in a gale	3- 2-15
157	Bayano	ax. c.	5,948	Probably torpedoed by German sm. in Irish Sea	12- 3-15
150	Ramsey	ax. c.	——	Sunk by German ax. c. Meteor, North Sea	8- 8-15
159	India	ax. c.	7,900	Sunk by German sm., North Sea	10- 8-15
159	Royal Edward	tr.	11,117	Sunk by sm., Ægean Sea	14- 8-15
160	Marquette	tr.	7,057	Sunk by German sm., Ægean Sea	26-10-15
160	Ramazan	tr.	3,477	Sunk by German sm., Ægean Sea	17- 9-15
161	Woodfield	tr.	——	Sunk of coast of Morocco	30-11-15
	Hythe	aux.	201	Collision, Ægean	29-10-15
158	Princess Irene	m. l.	——	Internal explosion off Sheerness	27- 5-15
163	Medusa	m. l.	——		
161	Abbas	c. g.	298	Sunk by German sm. off Sollum Harbor, Egypt	6-11-15
161	Abdel Monaym	c. g.	598	Sunk by German sm. off Sollum Harbor	6-11-15
161	Anglia	h. s.	1,862	Sunk by mine, English Channel	17-11-15
	Fishguard II	tr. s.	——	Foundered in gale, North Sea	17- 9-14
160, 161	Tara	p. b.	6,322	Sunk by German sm., Mediterranean	5-11-15
161	Aries	y.	——		15
161	Irene	y.	——		15
164	Turbulent	?			
164	Nomad	?			
164	Nestor	?			

In addition to the above, the press reports that several other English submarines have been destroyed. The list above includes only those which were apparently officially announced by the British Admiralty.

FRENCH WARSHIP LOSSES

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
156	Bouvet	b.	12,007	Sunk at the Dardanelles	18- 3-15
157	Leon Gambetta	a. c.	12,352	Torpedoed by Austrian sm., Straits of Otranto	26- 4-15
162	Amiral Charnier	c.	4,702	Torepdoed, Mediterranean	8- 2-16
156	Mousquet	d.	298	Sunk by Emden at Penang	28-10-14
156	Dague	d.	720	Sunk by Austrian mine off Antivari	24- 2-15
	Branlebas	d.	330	Sunk by mine	
162	Renaudin	d.	756	Torpedoed, Adriatic	18- 1-16
164	Fourche	d.	845	Sunk by Austrian sm., St. of Otranto	26?-6-16
164	Fantassin	d.	453	Sunk incident to collision	- 6-16
	Zelée	g. b.	636	Sunk by German cruisers at Tahiti	22- 9-14
	No. 347	t. b.	97	Sunk in collision with each other	9-10-14
	No. 338	t. b.	97		
	——	t. b.	——	Reported lost	- 1-15
	No. 331	t. b.	97	Sunk in collision off Cherbourg	16- 6-15
	No. 219	t. b.	87	Sunk off Nieuport	- 1-15
155	Curie	sm.	392	Sunk by Austrians at Pola	23-12-14
156	Saphir	sm.	386- ?	Sunk at the Dardanelles	15- 1-15
	Joule	sm.	392- ?		
	Calypso	sm.	345-490	Rammed and sunk during maneuvers off Cape Lardier	8- 7-15
159	Mariotte	sm.	522-615	Sunk at the Dardanelles	20- 7-15
160	Turquoise	sm.	386- ?	Sunk in the Sea of Marmora	3-11-15
161	Fresnel	sm.	392- ?	Sunk in the Adriatic by an Austrian ship	5-12-15
162	Provence	ax. c.	18,400	Torpedoed, Mediterranean	26- 2-16
	Indian	ax. c.	800	Sunk by sm. off Rhodes	8- 9-15
	Calvados	tr.	——	Sm., Mediterranean	-11-15
158, 159	Casa Bianca	m. l.	945	Sunk in the Ægean Sea by a mine	3- 6-15
161	Monge		392- ?	Sunk by Austrians, Adriatic	28-12-15

RUSSIAN WARSHIP LOSSES

	Pallada	a. c.	7,775	Sunk by German sm., Baltic	11-10-14
155, 156	Jemtchug	c.	3,130	Sunk by Emden, Penang	28-10-14
	Donnetz	g. b.	1,224	Sunk by Turks, Black Sea. Raised by Russians	31-10-14
	Kubanez	g. b.	1,280	Reported by Turks sunk by Turkish d.	29-10-14
159	Sivutch	g. b.	875	Sunk by Germans, Baltic Sea	20- 8-15
	Kubanetz	g. b.	1,200	By gunfire, Odessa	29-10-14
162	Leit Pushtscheen	t. b.	——	Sunk by mine, Black Sea	10- 3-16
	Putschino	t. b.	——	By gunfire	30-10-14
155	Prut	ax. c.	5,440	Scuttled to avoid capture	29-10-14
	Riasan	tr.	3,522	Captured by Emden	6- 8-14
158	Yenisei	m. l.	2,926	Sunk by German sm., Baltic	4- 6-15
	Oleg	m. l.	1,125	Sunk, Black Sea	24-12-14
	Athos	m. l.	1,743	Sunk, Black Sea	24-12-14
163	Portugal	h. s.	——		

Various German reports state that Russian men-of-war were destroyed in the several minor engagements in the Baltic. These losses were never officially announced by the Russian Admiralty.

JAPANESE WARSHIP LOSSES

	Shirotaye	d.	380	Ran ashore, Tsing Tao	4- 9-14
	No. 33	t. b.	82	Sunk by mines while mine-sweeping off Tsing Tao	11-11-14
	Name unknown	t. b.	——	By mine	
154, 156	Takachiho	tr. s.	3,700	Torpedoed by German d., S-90, off Tsing Tao	17-10-14

In addition to the above, five special service ships were sunk during the operations off Tsing Tao.

ITALIAN WARSHIP LOSSES

160	Benedetto Brin	b.	13,215	Sunk by internal explosion	28- 9-15
158	Amalfi	a. c.	9,958	Sunk by Austrian sm., Adriatic	7- 7-15
158	Garibaldi	a. c.	7,234	Torpedoed off Ragusa, Austrian sm.	18- 7-15
158	Turbine	d.	325	Scuttled to avoid capture after engagement with Austrian vessels, Adriatic	24- 5-15
164	Citta di Messina	ax. c.	3,495	Sunk by Austrian sm., St. of Otranto	26?-6-16
161	Intrepido	d.	680	Sunk by mine, Adriatic	17-12-15
	5-PN	t. b.	118	Torpedoed by Austrian sm. off Venice	26- 6-15
	17-OS	t. b.	118	Sunk by own mine while mine-laying off Salvore	7-15
158	Medusa	sm.	241-295	Torpedoed and sunk, Austrian sm.	17- 6-15
	Nereide	sm.	221-315	Sunk by Austrian sm., Adriatic	5- 8-15
161	Re Umberto	tr.	——	Sunk by mine, Adriatic	17-12-15

LOSSES OF GERMANY AND HER ALLIES

GERMAN WARSHIP LOSSES

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
164	Pommern	b.	13,040	Sunk by gunfire, battle of Jutland	31- 5-16
164	Lutzow	b. c.	28,000	Sunk by gunfire, battle of Jutland	1- 6-16
155	Yorck	a. c.	9,350	Sunk by German mine near Wilhelmshaven	3-11-14
155, 156, 158	Scharnhorst	a. c.	11,420	Sunk by English forces off Falklands	8-12-14
155, 156, 158	Gneisenau	a. c.	11,420	Sunk by English forces off Falklands	8-12-14
155	Friederich Karl	a. c.	8,858	No official report. Press reports that she was lost in the Baltic	12-14
156, 163	Bleucher	a. c.	15,550	Sunk by British forces off Doggerbank	24- 1-15
160	Prinz Adalbert	a. c.	8,858	Sunk by British sm. in Baltic	23-10-15
153, 154	Mainz	p. c.	4,280	Sunk by British forces, North Sea	28- 8-14
153, 154	Koeln	p. c.	4,280	Sunk by British forces, North Sea	28- 8-14
153, 154	Ariadne	p. c.	2,618	Sunk by British forces, North Sea	28- 8-14
154, 155	Hela	p. c.	2,003	Sunk by British sm. E-9, North Sea	13- 9-14
153	Augsburg	p. c.	4,280	By gunfire	7- 8-14
154, 155, 156, 163, 164	Emden	p. c.	3,592	Sunk by Australian c. Sydney, Indian Ocean	9-11-14
154, 155, 156, 160	Leipzig	p. c.	3,200	Sunk by English forces off Falklands	8-12-14
155, 156, 158	Nurnberg	p. c.	3,396	Sunk by English forces off Falklands	8-12-14
158	Dresden	p. c.	3,592	Sunk by British cruisers in Pacific	14- 3-15
155, 156, 158, 162	Koenigsberg	p. c.	3,340	Sunk by English forces in Rufiji River	11- 7-15
160, 161	Undine	p. c.	2,672	Sunk by British sm. in the Baltic	7-11-15
161	Bremen	p. c.	3,300	Sunk by sm. in the Baltic	17-12-15
	Friedrich	c. c.	8,865	Interned, Norfolk	7- 4-15
157	Kronprinz Wilhelm	c. c.	14,705	Interned, Norfolk	29- 4-15
155	Berlin	c. c.	17,324	Interned, Norway	16-11-14
	Patagonia	c. c.	———	Seized by Argentina, violation of neutrality	
	Eber	c. c.	1,000	Interned, Bahia	9-14
161	Kormoran II	c. c.	3,508	Interned, Guam	15-12-14
159	—— (two)	l. c.	———	Gulf of Riga	17- 8-15
153	Magdeburg	l. c.	4,478	Ran ashore in fog in Baltic; blown up by own crew after engagement with Russians	27- 8-14
155	Geier	l. c.	1,630	Interned in Honolulu	8-11-14
162	Karlsruhe	l. c.	4,822	No official report as to this vessel's destruction. Press reports state she was blown up by internal explosion while cruising in the Atlantic	11-14
164	Elbing	l. c.	5,000?	Sunk by gunfire, battle of Jutland	1- 6-16
164	Weisbaden	l. c.	5,000?	Sunk by gunfire, battle of Jutland	1- 6-16
164	Rostock	l. c.	4,820	Sunk by gunfire, battle of Jutland	1- 6-16
164	Franenlob	l. c.	2,650	Sunk by gunfire, battle of Jutland	1- 6-16
	Moewe	g. b.	640	Sunk by her own crew at Dar-es-Salam when English vessels appeared	14- 8-14
	Wissman	g. b.	about 300	Captured by English on Lake Nyasa	20- 8-14
	Planet	g. b.	640	Sunk by her own crew at Yap Island on approach of Japanese fleet	7-10-14
155, 162	Cormoran	g. b.	1,604	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
155, 162	Iltis	g. b.	886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
155, 162	Tiger	g. b.	886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
155, 162	Luchs	g. b.	886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
155, 162	Jaguar	g. b.	886	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
	Tsing-tau	g. b.	168	Interned, China	17- 8-14
	Vaterland	g. b.	168	Interned, China	17- 8-14
154	V-187	d.	689	Sunk by British forces, North Sea	28- 8-14
154	S-115	d.	413	Sunk by English destroyers, North Sea	17-10-14
154	S-117	d.	413	Sunk by English destroyers, North Sea	17-10-14
154	S-118	d.	413	Sunk by English destroyers, North Sea	17-10-14
154	S-119	d.	413	Sunk by English destroyers, North Sea	17-10-14
154, 162	S-90	d.	396	Driven ashore and wrecked by own crew off Tsing-Tao after having torpedoed the Japanese ship Takachiho	20-10-14
155	Taku	d.	276	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
155	S-124	d.	463	Accidentally rammed and sunk by a merchant vessel in Baltic	22-11-14

GERMAN WARSHIP LOSSES—Continued

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
	V-186	d.	750	By gunfire	
	S-106	d.	675	By gunfire	
154	S-126	d.	487	By sm.	6-10-14
159	G-196	d.	689	Sunk by British sm., North Sea	26-7-15
159	——	d.	——	Announced by France as sunk by two French torpedoboats off Belgian coast	22-8-15
	——	d.	——	Reported sunk by Russians in Baltic	19-8-15
	——	d.	——	Reported sunk by British sm. E-19 between Denmark and Sweden. Not confirmed	14-10-15
	——	d.	——		
	S-116	t. b.	477	Sunk by English sm. E-9, North Sea	6-10-14
164	—— (five)	d.	——	Sunk by gunfire, battle of Jutland	1-6-16
	A-2	t. b.	about 150	Sunk by British destroyers, North Sea	1-15-15
	A-6	t. b.	about 150	Sunk by British destroyers, North Sea	1-15-15
	——	t. b.	——	Officially announced by Russia, blown up by mine	30-6-15
	——	t. b.	——	Announced by German Admiralty, sunk by mines, Baltic	19-8-15
	——	t. b.	——	Announced by German Admiralty, sunk by mines, Baltic	19-8-15
	——	t. b.	——	Sunk by sm., Baltic	17-12-15
159	—— (eight)	t. b.	——	Gulf of Riga	17-8-15
	——	t. b.	——	Collision, Baltic	13-10-15
153	U-15	sm.	about 450	Sunk by British c. Birmingham	10-10-14
155	U-18	sm.	——	Destroyed by English d. Garry off Scotch coast	23-11-14
160, 161	U-8	sm.	246-295	Sunk by British destroyers	4-3-15
	U-51	sm.	——	Sunk, Black Sea	17-7-15
	U-12	sm.	246-295	Rammed and sunk by British d. Ariel	10-3-15
157	U-29	sm.	——	Announced sunk by British. Loss admitted by German Admiralty	26-3-15
	U-14	sm.	about 300	Sunk by British forces	8-6-15
	U-	sm.	——	Officially announced by French sunk in English Channel by French squadron	4-7-15
159	U-27	sm.	840-890	Announced by German Admiralty as missing	10-8-15
	——	sm.	——	Announced by English Admiralty as sunk by British aeroplane off Belgian coast. Denied by Germany	20-8-15
163	U-35	sm.	——		
	——	sm.	——	Reported run ashore near Riga in Baltic and probably lost. Not confirmed by Germany	19-8-15
	U-	sm.	——	Interned in Holland. Reported as being the U-8, but this vessel had been officially reported as having been sunk by the British	
	U-	sm.	——	Reported by British Admiralty as sunk by British seaplane off Belgian coast	27-11-15
156	U-3	sm.	——	Rammed	9-8-14
	Prince Adalbert	ax. c.	6,030	Captured by British c.	8-14
	Sudmark	ax. c.	5,113	Captured by British c.	15-8-14
153	Hedwick von Kaiser Wilhelm der Grosse	ax. c.	13,952	Sunk by British c. Highflyer	27-8-14
	Bethania	ax. c.	7,548	Captured by British c.	7-9-14
	Spreewald	ax. c.	3,899	Captured by British c.	12-9-14
153	Cap Trafalgar	ax. c.	18,710	Sunk by British ax. c. Carmania	14-9-14
	Max Brock	ax. c.	4,579	Captured by British c.	9-14
159	Itolo	ax. c.	299	Sunk by French g. b. at Cameroon	24-9-14
	Rhios	ax. c.	150	Sunk by French g. b. at Cameroon	24-9-14
	Soden	ax. c.	150	Captured by English c. off Cameroon River	1-10-14
	Gneisenau	ax. c.	8,185	Sunk by Belgians prior to evacuation of Antwerp	8-10-14
	Graecia	ax. c.	2,753	Captured by English c.	10-10-14
	Markomannia	ax. c.	4,505	Sunk by British c. in Indian Ocean	16-10-14
	Navarra	ax. c.	5,794	Sunk by English ax. c. in Atlantic	11-11-14
	Greif	ax. c.	——		
	Eleonore Woermann	ax. c.	4,624	Sunk by Australian c. Australia	6-1-15
158	Macedonia	ax. c.	4,347	Captured	30-4-15
	——	ax. c.	——	Reported as sunk in the Baltic	8-15
162	Greif	ax. c.	1,165	Sunk in battle, North Sea	29-2-16
154	Comet	ax. c.	977	Captured by Australian forces	18-10-14
	Karnac	ax. tr.	4,437	Interned, Chile	11-14
164	Hermann	ax. c.	3,000	Sunk by Russian destroyers	13-6-16

GERMAN WARSHIP LOSSES—Continued

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
153	Königin Luise	m. l.	2,163	Sunk by English d., North Sea	5- 8-14
	Rufin	m. l.	——	Sunk by Germans in Kiao-Chau Bay before surrendering Tsing-Tao to Allies	7-11-15
	——	m. l.	——	Reported by the French captured outside of Havre disguised as French collier	
158, 159	Albatross	m. l.	2,165	Sunk by Russians in Baltic. Reported raised and interned in Sweden	2- 7-15
159	Meteor	m. l.	3,613	Sunk by own crew after attempting to escape British forces, North Sea	8- 8-15
	Bunz	p. b.	——	Lost in Baltic	17-12-15
157	Prinz Eitel Kingani	a. m. v.	——	Captured by the British on Lake Tanganyka	
	Locksun	n. t.	1,020	Interned, Honolulu	8-11-14
158	Ophelia	——	1,153	Captured by English c., North Sea. English claim vessel an ax. c., while Germany claims her a hospital ship	17-10-15
	Several armed trawlers			Sunk by Russian destroyers	13- 6-16

In addition to the above, there seems to be no doubt that a great number of German submarines have been destroyed around the British Isles and possibly also in the Mediterranean and near the Dardanelles. The exact number of German submarines sunk during this war is not known, although the press state this number to be at least 50 and possibly as many as 70.

AUSTRIAN WARSHIP LOSSES

153	Zenta	c.	2,264	Sunk by French fleet off Antivari	16- 8-14
155, 162	Kaiserin Elizabeth	c.	3,937	Sunk by her own crew at Tsing-Tao	7-11-14
161	—— (Novara type)	c.	3,384	Torpedoed	13- 1-16
	——	g. b.	——	Sunk, Adriatic	24- 5-15
	Temes	r. m.	433	Struck a mine and sank off Shabatz	23-10-14
161	Triglav	d.	787	Sunk by gunfire in Adriatic	29-12-15
161	Lika	d.	787	Sunk by mine in Adriatic	29-12-15
153	No. 19	t. b.	78	Struck by a mine and sank at entrance to Pola	18- 8-14
	——	t. b.	——	Sunk by mine in Adriatic	
	——	t. b.	——	Sunk by mine in Adriatic	
	——	sm.	——	Sunk by an Italian d.	17- 5-15
	U-18	sm.	685-860	Reported by France sunk by a French aeroplane, Adriatic	1- 7-15
159	U-12	sm.	——	Torpedoed and sunk by an Italian sm., upper Adriatic	12- 8-15
159	U-3	sm.	233-295	Sunk by French d. Bisson	13- 8-15
	——	sm.	——	Gunfire, French fleet	
	U-11	sm.	860	Sunk by aeroplane	1- 7-15
	——	tr.	5,000	Sunk by Italian warships, Dmazzo roads; loaded with munitions	
	——	tr.	3,000	Sunk by Italian warships, Dmazzo roads, loaded with munitions	
162	Elektra	h. s.	——	Torpedoed, Adriatic	18- 3-16
	Beethoven	tr. s.	——	Struck a mine and foundered	17-12-14

TURKISH WARSHIP LOSSES

135	Messudyeh	b.	10,000	Sunk by British sm. B-11, Dardanelles	14-12-14
	Kheyr-Ed-Din	b.	9,900	Torpedoed by British, Sea of Marmora	9- 8-15
158	Mejidieh	c.	3,330	Sunk by Russian mine, Gulf of	
161	Burak Reis	g. b.	502	Scuttled to avoid capture	31-10-14
				Odessa	3- 4-14
158	Pelenk-I-Derih	g. b.	886	Sunk in Sea of Marmora, British sm.	24- 5-15
	Marmaris	g. b.	492	Sunk by British in Tigris River	1- 6-15
158, 159	Berk-i-Satvet (type)	g. b.	725	By mine near Dardanelles	29- 4-15
161	Issa Reis (type)	g. b.	500	Scuttled	1-11-14
	Doruk Reis	g. b.	502	Officially reported by Petrograd as sunk in Black Sea	10-12-15
	Malatia	g. b.	210	Officially reported by Petrograd as sunk in Black Sea	10-12-15
	Yadikar Nilet	d.	610	Sunk by British sm.	5-15
159	Barbarossa				
159, 161	Yar Hissar	d.	284	Sunk by British sm., Sea of Marmora	3-12-15
	Demir Hissar	t. b.	97	Stranded and interned at Chios	17- 4-15
157	Dhair Hissar	t. b.	97	Driven ashore, Greece	17- 4-15
	Nagara	tr.	——	Sunk by British sm., Sea of Marmora	5-15
158	—— (three)	tr.	——	Sunk by Russian warships; contained troops	
160	Carmen	tr.	4,424	Sm., Marmora	24-10-15

AUSTRIAN WARSHIP LOSSES—Continued

WHOLE NUMBER	NAME	TYPE	TONNAGE	REMARKS	DATE
161	Rechid Pasha	tr.	8,000	Sm., Marmora	12-15
	Bezemialen	tr.	——	Sunk, Black Sea	14-11-14
	Bachriachmar	tr.	——	Sunk, Black Sea	14-11-14
	Midiat Pasha	tr.	——	Sunk by sm.	6- 9-15

In addition to the above, other Turkish men-of-war may have been destroyed around the Dardanelles and in the Black Sea. Reports from England, Russia and Turkey in regard to these operations are so conflicting that it is impossible to accurately state what Turkish vessels have been destroyed, especially transports and supply ships.

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DIPLOMATIC RELATIONS

Prepared by A. F. Westcott, Ph. D., Instructor, U. S. Naval Academy

UNITED STATES AND ENTENTE POWERS

On **May 24** Secretary Lansing delivered to the British and the French Ambassadors a renewed protest against interference with United States mails.

The note asserts the principle that, while mails may be stopped in transit to or from a port that is effectively blockaded, "genuine correspondence" is in all circumstances inviolable; and no class of mail is subject to search for other purpose than the discovery of contraband. It is not subject to the "exercise of the rights of police supervision, visitation, and eventual seizure which belongs to belligerents as to ordinary cargoes." Contrary to these principles, Great Britain and France have censored and excised parts of correspondence, confiscated mail, and in some cases held mail indefinitely in port. The note reads in part:

"The arbitrary methods employed by the British and French Governments have resulted most disastrously to citizens of the United States. Important papers which can never be duplicated, or can be duplicated only with great difficulty, such as United States patents for inventions, rare documents, legal papers relating to the settlement of estates, powers of attorney, fire insurance claims, income tax returns, and similar matters, have been lost.

"Business opportunities are lost by failure to transmit promptly bids, specifications, and contracts.

"The Standard Underground Cable Company of Pittsburgh, for example, sent by mail a tender and specifications for certain proposed electrical works to be constructed in Christiania; after several weeks of waiting the papers have failed to arrive. The American company was told that the bids could not be longer held open and the contract was awarded to a British competitor.

"Checks, drafts, money orders, securities, and similar property are lost or detained for weeks and months."

Continuing, the note draws the following distinction between *merchandise* and *mail*:

"The government of the United States is inclined to the opinion that the class of mail matter which includes stocks, bonds, coupons, and similar securities is to be regarded as of the same nature as merchandise or other articles of property and subject to the same exercise of belligerent rights. Money orders, checks, drafts, notes, and other negotiable instruments which may pass as the equivalent of money are, it is considered, also to be classed as merchandise. Correspondence, including shipping documents, money order lists, and papers of that character, even though relating to "enemy supplies or exports," unless carried on the same ship as the property referred to, are, in the opinion of this government, to be regarded as 'genuine correspondence,' and entitled to unmolested passage."

ADMIRAL JELLICOE ON SEARCH AT SEA.—Included in the British memorandum of March 24 (see March-April *Institute*) is a report by Admiral Jellicoe on the difficulties of search at sea under modern conditions. His statement is supported by the French Ministry of Marine. The report reads:

"It is undoubtedly the case that the size of modern vessels is one of the factors which renders search at sea far more difficult than in the days of smaller vessels. So far as I know, it has never been contended that it is necessary to remove every package of a ship's cargo to establish the character and nature of her trace, etc., but it must be obvious that the larger the vessel and the greater the amount of cargo, the more difficult does examination at sea become, because more packages must be removed.

"This difficulty is much enhanced by the practice of concealing contraband in bales of hay and passengers' luggage, casks, etc., and this procedure, which has undoubtedly been carried out necessitates the actual removal of a good deal of cargo for examination in suspected cases. This removal cannot be carried out at sea, except in the very finest weather.

"Further, in a large ship, the greater bulk of the cargo renders it easier to conceal contraband, especially such valuable metals as nickel, quantities of which can easily be stowed in places other than the holds of a large ship.

"I entirely dispute the contention, therefore, advanced in the American note, that there is no difference between the search of a ship of 1000 tons and one of 20,000 tons. I am sure that the fallacy of the statement must be apparent to anyone who has ever carried out such a search at sea.

"There are other facts, however, which render it necessary to bring vessels into port for search. The most important is the manner in which those in command of German submarines, in entire disregard of international law and of their own prize regulations, attack and sink merchant vessels on the high seas, neutral as well as British, without visiting the ship and therefore without any examination of the cargo. This procedure renders it unsafe for a neutral vessel which is being examined by officers from a British ship to remain stopped on the high seas, and it is therefore in the interests of the neutrals themselves that the examination should be conducted in port.

"The German practice of misusing United States passports in order to procure a safe conduct for military persons and agents of enemy nationality makes it necessary to examine closely all suspect persons, and to do this effectively necessitates bringing the ship into harbor.

"The difference between the British and the German procedure is that we have acted in the way which causes the least discomfort of neutrals. Instead of sinking neutral ships engaged in trade with the enemy, as the Germans have done in so many cases in direct contravention of Article 113 of their own Naval Prize Regulations, 1909, in which it is laid down that the commander is only justified in destroying a neutral ship which has been captured if—

"(a) She is liable to condemnation, and

"(b) The bringing in might expose the warship to danger or imperil the success of the operations in which she is engaged at the time—

we examine them, giving as little inconvenience as modern naval conditions will allow, sending them into port only where this becomes necessary.

"It must be remembered, however, that it is not the Allies alone who send a percentage of neutral vessels into port for examination, for it is common knowledge that German naval vessels, as stated in paragraph 19 of the American note, 'seize and bring into German ports neutral vessels bound for Scandinavian and Danish ports.'

"As cases in point, the interception by the Germans of the American oil-tankers *Llama* and *Platuria* in August last may be mentioned. Both were bound to America from Sweden and were taken into Swinemünde for examination."

The Conference of the Entente Allies on economic policy, which concluded its work in Paris on **June 17**, has resulted in a comprehensive program for trade cooperation both during and after the war.

According to the report issued to the press, the following resolutions were adopted:

"A. *Measures for Duration of War*—Unified regulations forbidding nationals of the Allied Powers to trade with inhabitants of enemy countries or with enemy subjects wherever resident, or with commercial houses controlled by enemy subjects or under enemy influence—prohibition of all imports from an enemy country.

"B. *Measures for Period of Reconstruction*—Special privileges to countries that have suffered from destruction and spoliation, to enable them to renew raw materials, machinery, and merchant marine—preference to allied countries during the period of reconstruction—measures 'to prevent the exercise in their territories by enemy subjects of certain industries or professions of interest to the national defence or economic independence.'

"C. *Permanent Measures*—Independence of enemy countries as regards raw material and manufactured articles essential to the normal development of economic activity—independence in financial, commercial, and maritime organization—subsidized scientific and technical researches—preferential tariffs, and provisions to present 'dumping' of enemy products."

CONTROL OF INDUSTRY AND WAR.—The control of various industries in the Allied countries necessary to the waging of war on a large scale, pivotal industries, as Mr. Chamberlain called them the other day, was, as a matter of German policy and a corollary of the principle of "peaceful penetration," very largely captured by the Germans before the war. Where we have gradually awakened to the fact that the control of the Empire's base metals was largely in German hands, and that the supplies of sugar consumed in this country were mostly grown in enemy territory, Russia has suddenly found herself confronted by an arduous economic dependence of a much more far-reaching kind. Guns, shrapnel, motor-cars, locomotives, articles of clothing, medicines, explosives, a whole series of vital commodities were scarcely, if at all, produced in the country, and had to be imported when war broke out after considerable delays and at enormous expense. M. Jules Gay, a Belgian merchant of Odessa, in the course of a most searching examination of the case for an Anglo-Russian *rapprochement*, quite plainly sees that Russia, "either through voluntary agreements or by force, must in self-defence exert every effort to destroy German influence on her domestic economic life." Not only has Russian economic policy permitted the German control of Russian industrial enterprises, but it, in conjunction with the protective system of Germany, has actually fostered "big agriculture" in Germany, and so guaranteed Germany her own grain in war time and permitted her to prolong her present struggle.—*London Times*, 27/5.

DECLARATION OF LONDON ABANDONED

LONDON, July 8.

In accordance with the recent decision of the British Government to discontinue the partial enforcement of the Declaration of London, an Order-in-Council was published to-day under which all orders made under the Declaration of London since the beginning of the war are withdrawn.

The new order declares it to be the intention of Great Britain and her allies to exercise their belligerent rights at sea in strict accordance with the

law of nations. On account of the changed conditions of commerce and the diversity of practice, doubts might arise in certain matters as to the rules which the Allies might regard as in conformity with the law of nations, and it is ordered that the following provisions be observed:

"*First*—The hostile destination required for the condemnation of contraband articles shall be presumed to exist until the contrary is shown if the goods are consigned to or for an enemy authority or agent of an enemy state, or to or for a person in the territory belonging to or occupied by the enemy, or to or for a person who during the present hostilities has forwarded contraband goods to an enemy authority or agent of an enemy state, or to or for a person in territory belonging to or occupied by the enemy, or if the goods are consigned 'to order,' or if the ship's papers do not show who is the real consignee of the goods.

"*Second*—The principle of continuous voyage or ultimate destination shall be applicable both in cases of contraband and blockade.

"*Third*—A neutral vessel carrying contraband with papers indicating a neutral destination which, notwithstanding the destination shown on the papers, proceeds to an enemy port, shall be liable to capture and condemnation if she is encountered before the end of her next voyage.

"*Fourth*—A vessel carrying contraband shall be liable to capture and condemnation if the contraband, reckoned either by value, weight, volume or freight, forms more than half the cargo."

PARIS, July 8.

The French Government, following the example of Great Britain, has abandoned the Declaration of London as an interpretation of maritime international law. A decree to that effect appears in this morning's official journal.

A memorandum accompanying the decree says that the rules of the London Declaration were adopted by the Entente Allies at the beginning of the war as being the most expedient, but that experience has shown that they did not give the results expected, either in securing to belligerents a full exercise of rights or affording adequate guarantees to neutrals. Consequently, the memorandum continues, circumstances obliged the Allies to modify the rules of the Declaration. But these successive modifications lead to false interpretations of the Allies' motives, therefore, they decided it was better to return to the original rules of international law as generally accepted.

In so doing, the memorandum concludes, the Allies declare solemnly they will continue to observe the principles rigidly, respecting lives and property of neutrals and being ready to make compensation for any unjustifiable damage caused to bona fide merchants.—*N. Y. Times*, 7/8.

ITALY

NEW ITALIAN CABINET.—On June 10 the Salandra Ministry in Italy was defeated in Parliament by a vote of 197 to 158. The fall of the Salandra Cabinet, while hastened by the temporary success of the Austrian offensive, is attributed primarily to the failure of the government to keep in touch with the press and the leaders of opinion in the country, and to a general desire for a cabinet on a broader national basis representative of all parties. Most of those opposed to the ministry have been from the first strongly in favor of Italy's participation in the war.

The personnel of the new Italian Cabinet formed by Paolo Boselli was announced in dispatches of June 17. Baron Sonnino, of Signor Salandra's Cabinet, remains as Foreign Minister, the rest of the cabinet being made up of Radicals, Democrats, and Conservatives, and including two Socialists, one Republican, one Catholic, and one follower of ex-Premier Giolitti.—*N. Y. Nation*, 22/6.

NEUTRAL EUROPEAN POWERS

SWEDEN REMAINS NEUTRAL.—On May 17, Mr. Wallenberg, Foreign Minister of Sweden, speaking for the government, reaffirmed the declarations of neutrality previously proclaimed. Press dispatches announce that Russia and her present allies have reassured Sweden regarding the clause in the Treaty of Paris of 1855, forbidding permanent fortifications on the Aland Islands. This clause was not reaffirmed by Russia during the Baltic negotiations in 1907. The Aland Islands command the Gulf of Bothnia and the entrance to the Gulf of Finland, and are but six hours' sail from Stockholm. At the outbreak of the war they were fortified by Russia, and resisted a German naval raid on August 30, 1914. They offer an excellent base for Russian and British submarines, and are a menace to German shipping and naval operations in the northern Baltic. The Activists, or pro-German war party in Sweden, have attempted to use the Russian fortification of the islands and the British blockade as an argument for throwing Sweden into the war on the side of the Central Powers. Ever since the loss of Finland Sweden has been concerned for the protection of her eastern frontier against Russia.

GREECE YIELDS TO WESTERN ALLIES.—On June 9, France and Great Britain brought naval pressure to bear on Greece, as a result of her surrender to Bulgaria of Greek territory in Macedonia, and alleged disregard of the Greek constitution by the government. The Serres-Drama-Kavak zone, taken by Bulgaria, is said to be of especial importance as the source of the best "Turkish" tobacco. Greece received the territory by the Treaty of Bucharest.

The naval measures taken by the Western Allies consisted of an embargo on Greek ships in French and British ports, control of the port of Soloniki by French naval officers, and a virtual blockade of Greece. According to a joint note presented to the Greek Government on June 21, the demands of the Allies were as follows:

"1. Real and complete demobilization of the Greek Army, which shall revert as speedily as possible to a peace footing.

"2. Immediate substitution for the existing ministry of a business cabinet devoid of any political prejudice and presenting all the necessary guarantees for the application of that benevolent neutrality which Greece is pledged to observe towards the Allied Powers and for the honesty of a fresh appeal to the electors.

"3. Immediate dissolution of the Chamber of Deputies followed by fresh elections within the time limits provided by the constitution, and as soon as general demobilization will have restored the electoral body to its normal condition.

"4. Dismissal, in agreement with the Allied Powers, of certain police officials whose attitude, influenced by foreign guidance, has facilitated the perpetration of notorious assaults upon peaceable citizens and the insults which have been levelled at the Allied Legations and their members."

On June 21 Greece yielded to these demands. The Skouloudis Cabinet resigned and a new cabinet was formed under M. Zaimis. The new cabinet is regarded as temporary in character, pending the results of the election called for August 7. It is anticipated that M. Venizelos will then return to power. An order for the complete demobilization of the Greek Army was signed by King Constantine on June 27.

AUSTRIA

"PETROLITE" CONTROVERSY RENEWED.—The controversy between the United States and the Austro-Hungarian Government over the attack on the American steamer *Petrolite* by an Austrian submarine was revived and

brought to a sharp issue on June 28, when Secretary Lansing sent instructions by cable to Ambassador Penfield at Vienna to "request that an apology be made, that the commander of the submarine be punished and that reparation be made for the injuries sustained by the payment of a suitable indemnity." Secretary Lansing's note further described the attack on the *Petrolite* as "a deliberate insult to the flag of the United States and an invasion of the rights of American citizens." The note contains detailed testimony from the captain and crew of the *Petrolite* and the results of examinations of the vessel made by the Navy Department.—*Army and Navy Journal*, 1/7.

UNITED STATES AND MEXICO

In a note to the United States delivered **May 22**, Mexico demanded "an immediate withdrawal of American troops" from Mexico territory.

The note, 12,000 words in length, reviews previous negotiations, asserts that the entry of United States troops into Mexico after both the Columbus and the Glen Springs raids was without the consent of the Mexican Government, and points out that by the admission of the United States Government the Pershing force has accomplished its work and should therefore withdraw.

WARNING TO PERSHING.—General Jacinto Trevino, commanding the Carranza Army of the north, on June 16 advised General J. J. Pershing, American expeditionary commander, that any movement of American troops from their present line to the south, east, or west would be considered a hostile act and a signal to commence warfare. General Trevino acted upon specific instructions from Carranza.—*N. Y. Times*, 17/6.

MOBILIZATION OF U. S. MILITIA.—On June 18 the United States War Department issued a general order for the mobilization of the National Guard, and later moved a part of these troops to the Mexican border.

On **June 20** Secretary Lansing replied to the Mexican Note of **May 22**, refusing to withdraw United States troops from Mexico, stating that the troops had crossed into Mexico solely for the protection of the border, and that the Carranza government had shown neither ability nor willingness to undertake the obligation of hunting down Mexican raiders.

The note reviews at length the series of raids on United States territory and outrages on United States citizens. It brings evidence to show that Carranza adherents have taken part in these disturbances, and points out that the agreement between Generals Scott, Funston, and Obregon signed May 2 and providing that American troops be gradually withdrawn was not ratified by General Carranza. Later raids and the inactivity of Carranza forces have made such withdrawal unwise. The note closes as follows:

"If, on the contrary, the de facto government is pleased to ignore this obligation and to believe that 'in case of a refusal to retire these troops there is no further recourse than to defend its territory by an appeal to arms, the government of the United States would surely be lacking in sincerity and friendship if it did not frankly impress upon the de facto government that the execution of this threat will lead to the gravest consequences."

PAN-AMERICAN NOTE.—A note from Secretary Lansing to the diplomatic representatives of South and Central American nations, delivered June 22, explained that the object of the United States Government in retaining troops in Mexico was not intervention, but defence of United States territory.

CARRIZAL ATTACK.—The gravity of the Mexican situation was increased by an attack at Carrizal on June 20 on two troops of United States cavalry. First reports of the engagement came from Mexican sources only, which described the attack as having been provoked by the American troopers. Later accounts from American stragglers who made their way back to their own lines made it appear that Carranzista forces of General Trevino's command had treacherously attacked the two troops under pretence of a parley. It was not until Sunday that an authoritative report of the engagement was received, written by Captain Morey, commander of one of the troops, while hiding wounded after the action. Even in the light of this dispatch the precise situation is not quite clear, but it appears that Captain Boyd, the commander of the two troops, who was killed, requested permission to pass through the town of Carrizal, which was refused. A conference with the Carranzista commander was arranged and Captain Boyd, fearing an ambush, formed his men for attack. At this point the report contains the rather cryptic phrase, "He (Captain Boyd) was under the impression that the Mexicans would run as soon as we fired." At any rate it was the Mexicans who first opened fire. Thirteen United States troopers were killed and 17 made prisoners. So far from disavowing this incident, the de facto government, through Señor Arredondo, on Saturday of last week expressly accepted responsibility for it and justified the action of the Carranzista commander.—*N. Y. Nation*, 29/6.

RETURN OF CARRIZAL CAPTIVES.—On June 25 Secretary Lansing dispatched a short note demanding the surrender of prisoners captured at Carrizal, and an "early statement" from the Mexican Government regarding its course of action, to be made "through the usual diplomatic channels and not through subordinate military commanders." On June 29 orders for the surrender of the prisoners were issued by the Carranza Government.

A conciliatory reply from General Carranza to the United States notes of **June 20** and **June 25** was received on **July 4**.

The substance of the note is that "the withdrawal of American troops, on one hand, and the protection of the frontier on the other, are the two essential problems the solution of which must be the directing object of the effort of both governments." The note refers to Latin-American offers of mediation, but expresses the belief that "the same results may be obtained by direct negotiations." The note is conciliatory in tone, in contrast to the Aguilar Memorandum issued in Mexico City when the American note of June 20 was made public.

Conferences Proposed.—Replying to the Mexican note of July 4, Secretary Lansing on July 7 addressed a note to the Mexican Government proposing an immediate exchange of views "as to a practical plan to remove finally and prevent a recurrence of the difficulties which has been the source of the controversy."

PEACE IN SANTO DOMINGO

SANTO DOMINGO CITY, DOMINICAN REPUBLIC, July 5.

Rear Admiral William B. Caperton has effected a peace agreement between the provision government and General Desiderio Arias, leader of the revolution, who was directly responsible for the overthrow of President Juan Isidor Jiminez two months ago.

General Arias had the alternative of disarming his troops or of fighting the United States. He chose the former.

Two thousand American marines and bluejackets are now on Dominican soil and Rear Admiral Caperton, in command of United States naval vessels in Dominican waters, gave General Arias to understand that he must surrender or fight. He demanded unconditional and immediate disarmament.

The best informed persons here believe that the stand taken by Rear Admiral Caperton will definitely end all revolutionary disturbances. They see in it an American protectorate, which will provide for a financial advisor for the Dominican Republic, and that the administration of affairs here will be along lines similar to those which were brought about when the United States took Hayti under its protection.—*N. Y. Herald*, 7/6.

FAR EAST

DEATH OF YUAN SHIH-KAI.—On June 6 occurred the death of Yuan Shih-kai, president of the Chinese Republic. He is succeeded by the vice-president, Li Yuan-hung. It is anticipated that the change of power will unite north and south and bring peace to China.

"Li Yuan-hung is 52 years old. He served on a cruiser during the Chino-Japanese War and later entered the army, holding several commands and spending two years in Japan for the study of fortifications. On the outbreak of the revolution at Wuchang he was coerced into accepting command of the revolutionary forces, whose operations he directed. He was mainly instrumental in arranging for the Shanghai peace conference, and after the abdication of the Manchus was elected vice-president of the republic and appointed chief of the general staff. He was made a general, and in October of 1913 was re-elected vice-president."—*N. Y. Times*, 7/6.

RUSSO-JAPANESE ENTENTE.—A Russo-Japanese Convention was signed at Petrograd on July 3. The terms, as reported in the Japanese press, are as follows:

"1. Russia shall cede to Japan that section of the Manchurian railway between Changchun and a certain point near Harbin. This will afford Japan's South Manchuria Railway an easier access to the Russian metropolis in Manchuria.

"2. Japan shall supply Russia with arms and ammunition as long as the war in Europe lasts.

"3. Russia shall accord liberal treatment to the Japanese residing and engaged in business in eastern Siberia and north Saghalien, as well as in the railway zone of north Manchuria.

"4. Russia shall throw open to international commerce the harbor of Vladivostok, and shall not increase the armament of the port to such an extent as would cause apprehension on the part of Japan.

"5. Russia and Japan shall respect each other's interests in Manchuria and Mongolia. Should disturbance arise in the Russian sphere of influence in these territories while Russia is engaged in the war against Germany and Austria, Japan shall, upon Russia's request, undertake to pacify the country.

"6. In case Japan is obliged to take necessary measures to preserve the peace and open-door in China, Russia shall not hinder the execution of such measures. Should a third power or powers obstruct such measures, Russia shall, upon Japan's request, take common action with Japan for the removal of such obstruction."

The consensus of opinion is that the cardinal point of the agreement is the transfer to Japan of some 100 miles of the Changchun-Harbin branch of the Manchurian Railway of Russia. At the peace-conference of Portsmouth, Japan strove to secure the whole line from Port Arthur to Harbin, but Russia ceded only that section of the line between Port Arthur and Changchun. This proved a great handicap to the management of the South Manchuria Railway, and Japan has been coveting the remainder of the line up to Harbin.

The publication of the new pact with Russia is being deferred to secure agreement with England. According to a statement by Count Okuma:

"The fundamental principle of the new treaty with Russia is the same as that embodied in the Anglo-Japanese treaty of alliance, namely, the preservation of the peace of the Far East and the maintenance of the integrity of China."

It is interesting to note that the three Japanese warships, *Sagami, Tango,* and *Soya,* originally captured from Russia in the war of 1904-5, have recently been sold to the Russian Navy. They were delivered to the Russian naval authorities at Vladivostok on April 3.—*Literary Digest,* 24/6.

NAVAL PUBLICATIONS

BOOK REVIEWS

"The Problems and Lessons of the War." Clark University Addresses. Edited by George H. Blakeslee, with a foreword by G. Stanley Hall. (New York, G. P. Putnam's Sons.)

In this book of unusual depth and range, we have no less than twenty-five addresses by men whose average reputation is notable in their widely divergent pursuits, and whose opinions differ as night from day concerning the problems discussed—Preparedness, Economic Aspects of the War, Proposals for Restricting or Eliminating War, the German Theory of Militarism and of the State, Naturalized Americans, British and German Viewpoints, and Pan-Americanism. President Hall, in explaining the purpose of the book, says that "a nation so unprecedentedly composite as ours must regard a true impartial neutrality that hears and weighs all sides as part of its manifest destiny, and this gives us in some sense a judicial position above that of the warring nations of Europe, so that the verdict of this country about the war, if it ever reaches any degree of unanimity, ought to be the verdict of history."

We should expect, then, to find a non-partisan spirit shown by the editor of the book, Professor Blakeslee, and this expectation is largely warranted. If Professor Blakeslee, on the one hand, savagely attacks the Navy League for certain passages in "The Seven Seas," its former official publication, on the other hand, he prints four addresses strongly favoring preparedness in policy" as well as in armament. "Neither military nor economic cedence. In other divisions or groups of essays he balances one side against the other in equal proportions. In his introduction he claims that "much of Europe's . . . . suffering has been caused by a failure not so much of character as of intellect," and he complains of the "loose thinking so characteristic of those" who believe in preparedness. "One may sooner raise one's self by one's boot straps than maintain peace by world preparedness. . . . . Each navy cannot be the strongest," he insists. Yet he admits that "to fight for our national policy is perfectly intelligible; if necessary, in most cases, we all intend to do so." He believes our navy is large enough now, yet he makes no attempt to disprove Mr. Putnam's statement in the same book—"We contend that to-day the safety of the United States depends upon the British fleet. . . . should Americans be willing to leave their safety and their liberty dependent upon the men and the resources of another state?" Professor Blakeslee contributes his most valuable comment when he deals with "the trend of history toward ever larger political units," pointing out the peaceful unification of Scotland and England, of the north and south German states, of Italy, and of our own thirteen colonies, and the present three great units of the world—the Entente Allies, the Central Powers, and the Pan-American Union.

Perhaps the most striking and eloquent essay in the book, if not the most immediate in its importance, is Norman Angell's plea for "preparedness in policy" as well as in armament. "Neither military nor economic strength," he maintains, "can of themselves either protect your rights or insure your security. They can only do that if they are linked to a defined international policy known to yourselves, to the world at large, and to your prospective enemies."

Of direct interest to naval officers are addresses by Ira N. Hollis, who contributes an illuminating discussion of "The Naval Lessons to the United States in the Present War"; by Rear Admiral F. E. Chadwick, on "The World-Wide Extension by International Agreement of the Principle of the Monroe Doctrine"; by Arthur Gordon Webster, on "The Functions of the Naval Consulting Board"; and by George Haven Putnam, on "The Defense of the Republic and the Maintenance of Our National Obligations."

Two groups of essays deal with the clash of opinion between the British and the German viewpoints. Here we have a battle royal without quarter. Oil and water would mix as well as the opinions of Morton Prince and Stanton Coit for the British side, and those of Kuno Francke and John A. Walz for the German side of the controversy. Not the least interesting of these four essays is Professor Walz's "What a German Victory Would Mean to the World." We are told that Germany can never hope to become mistress of the sea, since "every physical and geographical basis is lacking," that no neutral nations of Europe need fear the consequences of a German victory, since the "five little nations" that are "the next-door neighbors of the German Empire . . . . if they really feared that a German victory would threaten their independence, would have joined the Allies long ago."

Evidences of the "loose thinking" of which Professor Blakeslee complains are not altogether wanting in his own address, as well as in several others. He believes that each nation should be left to work out its destiny in peace, yet he is glad that the European *status quo* was not put into operation ten years ago, since "it would have given an international guarantee to the existence of European Turkey." Why not let Turkey alone, too? One exception leads to others. Learned professors, diplomatists, statesmen, have much to say about "the *status quo*." Is there such a thing in Nature—in human nature? Two years ago we were told that a world war was impossible; now we are told that this is the last war. Professor Blakeslee thinks that war indicates "the world's intellectual bankruptcy." Perhaps it does, but it also indicates tremendous spiritual forces, of which the professor says nothing.

We read of many "Proposals for Restricting or Eliminating War," and when we have finished, they remind us of the old story about Sir Isaac Newton, who thought he had made an improvement in the construction of a kennel for his cats. For the big mother cat he provided a large door; for the kittens, a little door. He was greatly disappointed to find that the kittens followed the mother cat through the large door, and that in fact the kittens invariably shunned the little door. So it is with the Sir Isaac Newtons of pacificism. They plan new doors for the nations of the world to walk through, but the nations proceed to walk through the old door.

The addresses in the book not previously mentioned are as follows: "The Poison of Preparedness," by Hon. Warren Worth Bailey, M. C.; "The Economic Position of the United States at the Close of the War," by Hon. George E. Roberts; "The Economic Road to Permanent Peace," by William English Walling; "Eliminating the Economic Causes of War," by Roger W. Babson; "Does Nationalism Answer Present-Day Needs?" by Edward Krehbiel; "Federation or Inter-State Anarchy," by George W. Nasmyth; "The League to Enforce Peace," by Hon. Samuel J. Elder; "The British Union of Democratic Control," by Hon. Francis Neilson, M. P.; "The 'Wisconsin Plan,'" by Emily G. Balch; "Some of the Rights and Obligations of American Citizenship," by Hon. George W. Anderson; "To What Extent is America Served by Suppressing the Racial Traditions of its Hyphenated Citizens," by Camillo von Klenze; "The Effect of the War Upon Pan-American Co-operation," by Senhor Manoel de Oliveira Lima; "The Influence for Peace in the Red Cross Work," by Mabel T. Boardman.

No one of these addresses, except for a doubtful case which need not be mentioned, is lacking in discussion of considerable interest. It is obviously impossible to review such a monumental series in a page or two; sufficient to express the opinion that the contributions of Professor Francke, Dr. Elder, and Dr. von Klenze are of great interest. H. C. W.

"Aircraft in Warfare—The Dawn of the Fourth Arm." By F. W. Lanchester. (London, Constable and Company, Limited.)

General.—In this book on the above subject, published in November, 1915, F. W. Lanchester, who is considered as one of the foremost authorities on aeronautics in England, describes the use of aircraft in the present war in Europe and gives a comprehensive view of their employment, together with interesting side-lights on their capabilities and short-comings.

This work is really a resumé of the series of articles appearing in "Engineering," beginning September 4, 1914, and carrying on to December 24, 1914.

Throughout these articles the author constantly refuses to consider the usefulness of dirigibles. In the course of the articles he initiates and develops a mathematical law in which he turns the n-square law and shows the tremendous advantage of superiority in numbers and thus the advantage of concentration of attack and the division of the enemy. He shows the application of this principle in the battle of Trafalgar, in which the coincidence of the n-square law is at least remarkable.

While assuming that in attempting to reduce the problem to mathematical form it becomes necessary to change these variables which are difficult of determination, he still makes an excellent case, particularly in the case of contact with similar military forces. He finally shows remarkable advantages to be gained by numbers in the use of aircraft.

The success of the Advisory Committee for Aeronautics in England, in securing the rapid development of aircraft, is clearly shown, as well as the very close relations existing between aircraft and naval defense.

Besides the use of aircraft as direct adjuncts of military forces, he shows the very great advantage to be gained by the employment of an independent air fleet.

Throughout these papers there is a strong trend toward the separation of the control of aeronautics from the Army and Navy, and the author shows need of a Board of Aeronautic Construction to secure the proper development of this new service. Although himself a member of the National Advisory Committee, he does not advocate the extension of its functions to cover this new work, but advocates the organization of a Board of Aeronautic Construction. The object of this is to provide for the aeronautic establishment in time of peace and for its rapid expansion to meet with the needs in time of war. In this respect he states as follows:

"The key to the whole situation lies in the proper organization and control of the manufacturing resources of the Government, as at present represented by the Royal Aircraft Factory. This must be based on a clear conception of the duties of the factory as the birthplace of new types and nursery for their development, also as the headquarters of full-scale experimental work, that is to say, tests and investigations engineering in character, or those in which actual flying is involved, as distinct from laboratory experiment."

He particularly deplores the tendency to divorce the aircraft development of the two services, the Army and the Navy, and states that "to separate the experimental or developmental phase of construction appears to have nothing to commend it."

In his proposed Board of Aeronautic Construction he would provide a board whose existence would insure continuity of policy and whose members would be advocates of and responsible for the efficiency of the constructional program so far as the developmental side is concerned, and secure the necessary appropriations. This Board of Aeronautic Construction, in which both the Army and Navy would be represented by the responsible heads, respectively, of the two branches, namely, Director General of the Military Aeronautics, and the Director of the Air Department of the Admiralty, would have in addition a strong civilian contingent selected for their learning or attainments in such direction as aeronautic, or mechanical, engineering, manufacturing, naval architecture, business management, organization, finance, etc., including the superintending of an aircraft factory. He also considers that it would be very desirable that certain cabinet officers, such as Minister of War and the First Lord of the Admiralty, should be members of this board.

He reaches one conclusion that appears at least debatable, and that is, the dirigible from a military standpoint is a complete failure. In concluding the work he claims that a clear case has been made out for an immediate and thorough-going overhaul of the program and administration as touching the future of the Aeronautic Arm, and to this end urges for immediate consideration the following:

(1) That in view of the potentialities of the Aeronautical Arm, a comprehensive scheme of construction should be forthwith prepared, in which

provision shall be made for organizing, utilizing and developing every available source of manufacture and supply.

(2) That if possible certain of our present types of aeroplane be virtually adopted "for the duration of the war," and existing manufacturing facilities should be utilized for their uninterrupted production to the utmost of their capacity.

(3) That where it is decided that new types are required, new sources of production should so far as possible be tapped or new works equipped, in order that output should not be made to suffer. In other words, the policy should tend in the direction of establishing each new type with the factory for its production as a complete proposition.

(4) That more adequate provision be made for the development of improved models and new types, both as regards initial manufacturing facilities and finance.

(5) That a Board of Aeronautical Construction be formed on the lines adumbrated in the present work, to deal with the needs of the service and to settle specifications and approve the designs for new types, and generally to assume control and responsibility for our national aeronautical program, both as to sufficiency and otherwise.

"The Diplomacy of the Great War." By Arthur Bullard. Macmillan Company, 1916, 333 pages.

This could well be an introductory text-book on European diplomacy, though it purports merely to serve as an aid to understanding the moves on the diplomatic checker-board that will follow when the terms of peace are being settled. For several reasons it deserves to rank high among books called forth by the war.

In the first place, it is written by an American, and, although the author frankly prefers a victory for the Entente Allies, it is little tainted by hostile prejudices and rancorous epithets. For another thing, it is written in an entertaining style. The humor and dramatic interest of international relations are excellently suggested by the author's allusions to the "mervousness" of the British after the Russians had occupied the Oasis of Merv, and by his references to the wooing of Princess Salme of Zanzibar by a handsome German youth. His account of Prince Gortschakov's Caucasian frontier also is worthy of comic opera. Besides a high degree of journalistic skill, the author has, in the third place, an unusual grasp of the subject. It would be difficult to find a better sketch of diplomatic currents from 1878 to 1914; and Book II, on "New Elements in Diplomacy," including the growth of public opinion, is extremely suggestive.

If, however, the reader is particularly interested in the ideal of Das Deutschtum or the "religion" of war, he can find more in Cramb and Slater, and if in the principle of nationality, he should read Toynbee. But it is only fair to state that Mr. Bullard makes no pretense of being exhaustive, and to reiterate that he is never exhausting.

A full critical bibliography of diplomatic publications adds to the value of the book.

C. F.

"A Diplomat's Wife in Mexico." By Edith O'Shaughnessy (Mrs. Nelson O'Shaughnessy). Published by Harper Bros., New York and London. One volume, 356 pages. Price $2 net.

The title page describes the book as "Letters from the American Embassy at Mexico City, covering the dramatic period between October 8, 1913, and the breaking off of diplomatic relations on April 23, 1914, together with an account of the occupation of Vera Cruz"; and a better description of the contents of the book cannot well be given. The book thus consists of portions of the many most interestingly written and human letters that were sent by Mrs. O'Shaughnessy to her mother, Mrs. Elliott Coues, during this tense period. Mexico, during the entire period covered, was in an unsettled condition in its relation with the United States, which had not recognized the government under the dictatorship of Victoriano Huerta, a man who held the reins of the government because of the force of rapid changeable circumstances. It will be remembered that Huerta first came into prominence abroad when he escorted Porfirio Diaz to Vera Cruz after the latter's resignation on May 25, 1911. Huerta then defeated the opponents of Francisco Madero, the President of the Republic, under Pascual Orozco at Rellano on May 23, and again at Bachlumba on July 3, 1912, thus firmly establishing the Madero Government. On February 9, 1913, there was a sudden revolt in Mexico City under the leadership of the pupils of the military college who released from prison Felix Diaz and General Reyes. These men demanded Madero's resignation. Thus hard pressed, Madero sent to the North for General Huerta to come to his succor, with the result that after a nine days' battle in Mexico City order was restored and Madero made secure in his position. Later, Huerta, then Minister for the Interior, believed that his life was threatened by Madero's jealousy, and so seized the power from Madero, becoming President according to the sequence provided by the Mexican Constitution, Madero and his vice-president, Pino Suarez, being shot on February 23, 1913.

Our ambassador having been recalled, the representing of this government in Mexico City devolved upon Nelson O'Shaughnessy, the American Charge d'Affaires, who had no easy task and accomplished much through his own personality and friendly relations with General Huerta. The character sketches that the book contains of this famous descendant of the old Aztecs are vivid and make interesting reading, the writer evidently appraising him as a strong man.

A fine portrait of the late Rear Admiral Sir Christopher Cradock is included among the well chosen illustrations that the book contains, and Mrs. O'Shaughnessy thus speaks of him: "We had such a friendly talk with Sir Christopher, who said—and we quite concurred—that he didn't see any cause for feeling about British action in Mexico, adding that he had no politics, no idea in the world except to save British lives and property, and that he and Admiral Fletcher were working together, he hoped, in all sympathy and harmony. There is something so gallant about him, but with a note of sadness, and I am conscious of a certain detachment in him from the personal aims of life."

The whole book is written in this easy style that creates an atmosphere of Mexico for its readers. The characterizations of the many prominent individuals met are penned in few words with unusually keen perception mixed with an occasional bit of humor. There is no trace of malice against any one to be found in the book, but only a deep current of sympathy for the down-trodden Mexican people with a love for the beautiful scenery of rich Mexico that runs throughout its pages.

Naval officers of Mexican experience will enjoy reading this vivid story of the American colony and the diplomatic life that represents the side of events that are always obscure to them. They will find in its pages many of their acquaintances, including Mr. Lind and a large number of their brother officers in the Navy and Marine Corps.

Such nearly forgotten incidents as the forced loan obtained by Huerta, the appearance of the periodical "Mister Lind," as well as the ever-present northers, the groups under the 'portales' of the Cafe Diligencias—all rendered the more enjoyable because they belong to the past—are brought freshly to one's mind in a narrative way. The many who, while on duty off the long dreary stretch of the Mexican coast, enjoyed the reading of Flandrau's "Viva Mexico!" and Schroeder's "The Fall of Maximilian," should add this book without fail to their reading list. R. E.

"Ian Hardy, Senior Midshipman." By Commander E. Hamilton Currey, R. N. (J. B. Lippincott Company, 1916.)

This is the third of a series of boys' books depicting the career of a lad in the British Navy. It is a narrative of the days of the old sailing frigate when the Argentine and Uruguay were a wild, unorganized country requiring an occasional chastisement such as a single ship might impose, and when England maintained a squadron on the West African coast to repress the slave trade. Racy yarns by petty officers, scenes at Gibraltar, an adventure with a shark, and a voyage up the Uruguay ending in a fierce hand-to-hand conflict with the local authorities—it is with such materials that the author has built up his story.

Commander Currey shows his intimate knowledge of the sea, the old sailing ships, and the life at Gibraltar. His midshipmen are robust, healthy-minded, fun-loving lads, fond of adventure, and jammed full of courage. If the reader feels something of disappointment in the book, it is because the author has not devoted himself more fully to the real life, the daily routine of the midshipmen, where he is unquestionably good, instead of introducing so often the unusual and the romantic, and occasionally the absurd. C. S. A.

"Ocean Shipping" (The Basic Principles of Marine Transportation with Particular Reference to the Foreign Trade of the United States). Published by the National Foreign Trade Council, 64 Stone Street, New York. 179 pages. Price 25 cents.

A valuable handbook for reference and desk purposes. Its scope is outlined in the Foreword, an extract from which follows:

"Discussion of national shipping policy, particularly since the outbreak of the European War, has been marked by conflicting claims, obscurities relating to the simplest elements of the question, fallacious arguments and advocacy of uneconomic curatives; all thriving upon the lack of knowledge referred to.

"In the hope of shedding light upon little understood principles of ocean transportation, your committee has caused to be prepared a monograph, entitled "Ocean Shipping," describing in simple language basic phases of the shipping question which, almost without exception, have been subjects of controversy and misunderstanding in public discussion and in the press. It is the belief of your committee that the publication of this monograph and its distribution throughout the United States will be a valuable aid to public knowledge and clearer thinking."

NAVAL ACADEMY GRADUATES' ASSOCIATION

The thirty-first annual business meeting was held on June 1, 1916, with 26 members present. Col. R. M. Thompson, Class '68, presided.

The following Council was elected for the ensuing year: Col. R. M. Thompson, Class '68; Chief Constructor D. W. Taylor, Class '85; Captain L. M. Nulton, Class '89; Commander H. H. Hough, Class '91; Commander W. T. Cluverius, Class '96; Lieut. Commander J. W. Greenslade, Class '99, and Professor D. M. Garrison, Class '95, Secretary-Treasurer.

Commander C. T. Jewell, Sec.-Treas. of the Farragut Memorial Window Committee, submitted a verbal report on the work of that committee during the year. A synopsis of that report is given below:

There has been no meeting of the committee this year for two reasons; the first was, there was practically nothing to do, and the second, we were too scattered to get together. Therefore my report is of the Secretary and not of the committee. The designs of the window are accepted in principle, but have not been accepted in detail as yet by the Board on Memorials at the Naval Academy. Last year they made certain objections and this year we re-submitted the plans. There are details not as yet approved. We started out knowing little about art, but we have been so mixed up with artists that now we have fixed ideas. The Board on Memorials has not had that advantage, and still finds fault with certain technical points on which changes can presumably be made. After leaving the hands of the Board on Memorials, we are in the hands of the Fine Arts Commission. At any rate, the work on the designs is proceeding.

An appeal was issued last fall to those graduates who have not subscribed five dollars. It immediately resulted in a new influx of subscriptions, at times lively, at all times steady. Also it brought in a number of complaints; not a great many, because we have received 400 subscriptions and not more than 25 complaints, but enough to show that there is a tendency among the graduates to criticize some of our acts, particularly that a contract has been let before the money was in hand. The committee considered that they were bound to get the window, and they had to sign a contract to get the window.

The interests of the Association have been most carefully guarded in the contract, and nothing is to be paid for until accepted and in place. As it

is now, about 40 per cent of the living graduates have subscribed—60 per cent have not. We have nearly $6000 subscribed; we need $10,000. As a matter of fact, there are still nearly 2000 graduates who have not subscribed. I am still optimistic about getting the money. We may have to send out another appeal, but that will be all that is necessary, and the money should assuredly come in.

There has been a tentative offer made by some of the graduates to agree to see that the money is guaranteed. My personal inclination is, that every man should join in this, and I still hope that we will be able to get the money from individuals and not need to go to a syndicate for friendly offers. We still need, I think, further publicity. We get letters from time to time, saying this is the first the writers have heard. It has been well published in the service papers and organs of the Graduates' Association, but those who have already subscribed can do good by telling others about it.

Col. Thompson, senior member of the Corbesier Memorial Committee, reported the work of that committee. There were exhibited, for the inspection of the members present, two sketches of tablets. The one which the committee has accepted will include the bust of Lieut. Corbesier in bas-relief. The cost of this tablet will be $465, including cost of installation.

To date the subscriptions for this purpose are approximately $140.

The amendment to Article 5 of the Constitution of the Association came up for its second and final vote, and was adopted. On this question, the Secretary filed 1007 votes in favor of its adoption, and 164 not in favor.

The Constitution, therefore, stands amended, and Article 5 will now read:

There shall be an annual meeting and dinner at such time and place as may be determined by the Council, which all graduates shall be entitled to attend; but no one shall be entitled to speak or to vote at a meeting unless he be a member. Members unable to attend the meeting shall be entitled to vote by proxy in due form in writing.

A motion was made that the Council be requested to hold the next annual meeting and dinner at the Army and Navy Club in Washington. This motion was lost, and the Council will decide in their own discretion.

The Council presented to the meeting, for such action as might be thought advisable, under Art. 3, Sec. 1 of the Constitution, the case of Arthur Barnes Keating, Class 1900, Grad. No. 2416; Assn. No. 1051; declared a deserter from August 6, 1914; Lieut. Commander.

Motion was made and carried that he be expelled from the Association.

At the request of the Secretary, Commander J. R. P. Pringle, officer-in-charge of building and grounds, explained to the meeting the present condition of the Samoan memorial window. This window, a gift from the graduates, was installed in the old chapel. At the time of the tearing down of the chapel, this window, together with a window to Commodore Foxhall Parker, was stowed away.

It is thought possible that, by making some repairs, they may be made available for installation in Recreation Hall, Bancroft Hall. It is the intention of the authorities, if permission for such expenditure be granted, that the Government shall stand the cost of repairs and installation.

The motion was made and carried that the Council have authority in the premises to do what is possible for and necessary to secure these windows being replaced in some suitable position.

Commander Pringle also said:

Another piece of information: I received a proposition the other day from the ex-photographer of the Naval Academy to sell me his negatives, M. Casler, living in Annapolis. He did all the pictures of the Naval Academy for a number of years. Mr. Casler has a complete set of negatives of all individual photographs, classes and groups, and all buildings which date back to '72. He has absolutely a complete collection. If any individual wishes to get a photograph from Mr. Casler he can do so, and any other photograph between '72 and the date when the photographer went out of business. Mr. Casler would like to sell the whole collection of negatives, and wants $400 for the lot. I would suggest, if any graduate wants his photograph, he had better get in communication with him, as I think Mr. Casler intends to get rid of them.

NOTE.—Any one interested should communicate with Mr. M. M. Casler, 201 Hanover Street, Annapolis.

Motion made and carried that the Council be requested to arrange for the preservation of these negatives, if they can conveniently do so.

The Secretary reported that he had a communication from the midshipmen, in which they stated that the regiment were taking up a subscription to place a memorial—preferably a headstone—to Lieutenant C. A. Zimmerman, the late band leader. The midshipmen requested the cooperation of the graduates in their undertaking, in case their own subscriptions might prove insufficient for the purpose.

The Chair: "I think, if the meeting will authorize the Council to take whatever action may be appropriate, that they can have the funds."

Motion carried.

The meeting adjourned.

SYNOPSIS OF REPORTS OF THE SECRETARY-TREASURER, JUNE 1, 1916

Total number of graduates to date	4464
Increase since last report	179
Number of graduates living	3328
Number in Graduates' Association	2677
Increase since last report	210
Number of Association members living	2218
Number of graduates out of the service	638
Number whose whereabouts are unknown	74
Graduates in U. S. Army	60
Graduates in U. S. Coast Guard	11
Graduates in U. S. Naval Reserve	49

Balance on hand June 3, 1915		$ 216.78
Received from all sources during the year		2220.16
Total		$2436.94
Expenditures during year		770.96
Gross balance available June 1, 1916		$1665.98
Less Corbesier Fund:		
Guarantee	$500.00	
Subscriptions	137.00	
		637.00
Net balance in general fund June 1, 1916		$1028.98

At the annual dinner held the evening of June 1, 1916, covers were laid for 139. There were, however, a number of vacant chairs. These had been provided for graduates who had indicated their intentions of attending, and did not show up at the last moment. The senior graduate present was Commander C. E. McCay, U. S. N. (Ret.), and the junior, Mr. E. C. Palmer, Class '14.

Colonel R. M. Thompson, Class '68, acted as toastmaster. Toasts were responded to as follows: "The President," the Secretary of the Navy; "The Navy," Rear Admiral W. S. Benson, U. S. N.; "The Naval Academy," Captain E. W. Eberle, U. S. N.:

"Graduates in Civil Life," Mr. H. L. Ferguson, Class '92; "Sweethearts and Wives," the toastmaster.

After the dinner, those present accepted an invitation of the First Class, and attended the class german in a body.

CHANGES IN REGISTER

533 Class '63 Niles, Marston. Died, May 27, '16, Topsham, Me.
1170 " '74 Fiske, Bradley Allen. Ret., June 13, '16, R. Adml.
1289 " '76 Tappan, Benjamin. Ret., Apr. 26, '16, R. Adml.
1338 " '77 Werlich, Percival Julius. Died, Mar. 16, '16, Chicago, Ill.
1626 " '81 Sampson, Bias Clay. Died, May 17, '16, Galena, Ill.
1979 " '90 Davis, Cleland. Ret., May 22, '16, Comdr.
2120 " '93 Douglas, Richard Spencer. Died, June 3, '16, Pensacola, Fla.
2659 " '04 Morgan, Leman Edgar. Ret., Apr. 11, '16, Lt.
2685 " '04 Richards, Clarence Alvin. Died, May 26, '16, Lt., Sag Harbor, L. I.
3072 " '07 Montgomery, Robert Langford. Ret., May 16, '16, Lt. (J. G.).
3174 " '08 Saufley, Richard Caswell. Killed, June 9, '16, Lt. (J. G.), by fall from hydroaeroplane, Pensacola, Fla.
4384 " '15 Alexander, William Dennison. Ret., Apr. 5, '16, Asst. Pay.; Laurel, Md.

There is published in this issue a list of Class 1916, arranged in order of graduation. All will be commissioned ensigns in the service with the following exceptions: Alger, M. M.; Jefferis, L. V., and Hamilton, S. A.; to be re-examined physically; and Sitz, W. H.; Hawthorne, W. G.; Cauldwell, O. R.; Fuller, E. C.; Jacobsen, A. W., and Jenkins, E. H., who will be commissioned as second lieutenants in the U. S. Marine Corps.

MIDSHIPMEN, DATE OF 1912, GRADUATING CLASS OF 1916

No.	Name	State in which born	State from which appointed	No. in Grad. Ass'n
4465	Mullinnix, Henry Maston	Ind.	Ind.	2679
4466	Earle, Norman Pearce	Ill.	Ill.	2680
4467	Davison, Ralph Eugene	Mo.	Mo.	2681
4468	Moon, Don Pardee	Ind.	Ind.	2682
4469	Berkey, Russell Stanley	Ind.	Ind.	2683
4470	Bourne, Robert Cushman	Mass.	Mass.	2684
4471	Hussey, George Frederick, Jr.	Mass.	Mass.	2810
4472	Keliher, Thomas Joseph, Jr.	Mass.	Mass.	
4473	Hardison, Osborne Bennett	N. C.	N. C.	2685
4474	Schmidt, Hugo	Pa.	Pa.	

No.	Name	State in which born	State from which appointed	No. in Grad. Ass'n
4475	Hitchcock, Russell Snow	Mass.	Mass.	2686
4476	Braine, Clinton Elgin, Jr.	N. Y.	N. Y.	2687
4477	Reed, Malcolm Willard	Mass.	Mass.	2688
4478	Sitz, Walter Hoersch	Iowa	Iowa	2689
4479	Sutherland, Willis Chester	Iowa	Wis.	2690
4480	Safford, Laurence Frye	Mass.	Mass.	
4481	Miles, Arthur Clark	Colo.	Colo.	2691
4482	Fechteler, William Morrow	Cal.	At large	2692
4483	Wead, Frank Wilbur	Ill.	Ill.	2693
4484	Awtrey, Robert Adair	Ga.	Ga.	
4485	Krez, Conrad Adolph	Wis.	Wis.	
4486	Baker, Charles Adams	Va.	Va.	2694
4487	Ketcham, Tuthill	Ill.	Ill.	2695
4488	Carpenter, Donald Marshall	Pa.	Pa.	2696
4489	Lyle, Harris Knowles	Mass.	Mass.	2697
4490	Bogan, Gerald Francis	Mich.	Ill.	2698
4491	Dudley, Sidney Everett	Iowa	Wyo.	
4492	Fiske, Leon Sangster	Maine	Maine	2699
4493	Major, Earl Melvin	N. Y.	N. Y.	2700
4494	Loventhal, William Fishback	Ark.	Tex.	
4495	Glutting, Paul Rolland	Ind.	Ind.	2701
4496	Horne, Harold Matthews	Pa.	Mich.	2702
4497	Borden, Walter Eugene, Jr.	N. C.	N. C.	
4498	Emerson, Arthur Tenney	Mass.	Mass.	2703
4499	Geisenhoff, Arthur Cooper	N. Y.	N. Y.	2704
4500	Klein, Grover Cleveland	Ohio	Ohio	
4501	Boyer, William Francis	Mo.	Mo.	
4502	Furey, Bartley Gregory	N. Y.	N. Y.	2705
4503	Kitts, Willard Augustus, 3d	N. Y.	N. Y.	2706
4504	Rodgers, Bertram Joseph	Pa.	Pa.	2707
4505	Hamill, Carroll William	Tex.	Tex.	2708
4506	Terhune, John Alexander	N. Y.	At large	2709
4507	Havill, Clinton Hunter	N. Y.	Ohio	2710
4508	Bagby, Lew Wallace	Mo.	Mo.	
4509	Dague, Byron Scott	Ill.	Ill.	
4510	Swenson, Lyman Knute	Utah	Utah	2711
4511	Beatty, Frank Edmund, Jr.	D. C.	Minn.	2712
4512	Morgan, Gail	W. Va.	W. Va.	2713
4513	MacKay, Woodbury Eshorne	Mass.	Mass.	2714
4514	Bunnell, Gilbert Franklin	N. Y.	N. Y.	2715
4515	Kalk, Stanton Frederick	Ala.	Nebr.	2716
4516	Solberg, Thorwald Arthur	Wis.	Idaho	2717
4517	Roper, Clifford Harris	Cal.	Cal.	
4518	Sauer, Edward Paul	Iowa	Iowa	2718
4519	Selman, Augustus James	Tex.	La.	
4520	Carson, John Hazard	S. C.	S. C.	2719

No.	Name	State in which born	State from which appointed	No. in Grad. Ass'n
4521	Carlson, Milton Oren	Minn.	Ore.	2720
4522	Carney, Robert Bostwick	Cal.	At large	2721
4523	Radford, Arthur William	Ill.	Iowa	2722
4524	Martin, George Frederick	Cal.	Cal.	
4525	Vincent, John Alexander	Ill.	Ill.	2723
4526	Jenkins, Bernard Folsom	N. H.	N. H.	2724
4527	Alexander, Boyd Rufus	Ala.	Ala.	
4528	Earnhardt, Edwin Shell	N. C.	N. C.	2725
4529	Ericsson, Edward Lewis	N. Y.	N. Y.	2726
4530	Craven, Frederick Barnard	N. Y.	At large	
4531	Claghorn, Richard Raymond	Pa.	Wash.	2727
4532	Bloom, John Melbourne	Wis.	Mich.	2728
4533	Williams, John Emerson	Mass.	Mass.	2729
4534	Hawthorne, William Gillman	Ill.	Ill.	2730
4535	Kenworthy, Jesse Lloyd	Pa.	Pa.	2731
4536	Thompson, Webster Maddux	Va.	Va.	2732
4537	Cauldwell, Oscar Ray	Ind.	Ind.	2733
4538	Schrader, Albert Ernest	Ind.	Ind.	
4539	Vail, Louis Richardson	Pa.	Pa.	
4540	Casey, William Rossiter	N. Y.	N. Y.	2734
4541	Ryan, Dennis Leo	Tex.	Ariz.	2735
4542	Goen, Paul Swigart	Iowa	Iowa	2736
4543	Fraser, Archibald Eliot	N. J.	N. J.	2737
4544	Baugh, Harry VanCleve	Ill.	Ind.	2738
4545	Mayer, Andrew De Graff	Minn.	Minn.	2739
4546	Bateman, Arnold Hannington	N. Y.	Mont.	2740
4547	Halpine, Charles Greham	Mass.	N. Y.	2741
4548	Joy, Charles Turner	Mo.	Ill.	2742
4549	Watters, John Sproston, Jr.	La.	La.	2743
4550	Moore, Alva Jacob	Ill.	Kans.	
4551	Webb, Walter Whitfield	Wis.	Wis.	2744
4552	Gates, Nelson Nelles	Pa.	At large	2745
4553	Phelps, Henry Levings	Ill.	N. Y.	
4554	Holcombe, Benjamin Royall	Ore.	N. Y.	2746
4555	Webb, Archer Williams	N. J.	Ill.	2747
4556	Berwind, Charles Graham	Pa.	Pa.	2748
4557	Reinburg, John Ernest	N. C.	N. Mex.	2749
4558	Keady, William Leo	N. Y.	N. Y.	
4559	Wheeler, Charles Julian	Ala.	Ala.	2750
4560	Patterson, Theodore Thomas	N. J.	N. J.	2751
4561	Sternberg, John Alexander	Md.	Md.	2752
4562	Brewster, George Platt, Jr.	Colo.	Colo.	
4563	Ginder, Samuel Paul	Pa.	Pa.	2753
4564	Kercher, Merrill A.	Ind.	Ind.	2754
4565	Broadfoot, Henry Bryan	N. C.	N. C.	2755
4566	Ragsdale, Van Hubert	Ga.	Ga.	2756

No.	Name	State in which born	State from which appointed	No. in Grad. Ass'n
4567	Wilkes, John	N. C.	N. C.	2757
4568	Walker, Robert John	D. C.	Pa.	
4569	Twining, Robert Barber	Wis.	Wis.	2758
4570	Grosskopf, Homer Louis	Minn.	Minn.	2759
4571	Bacon, William Palmer	Ohio	Ohio	2760
4572	Fallon, Henry Netterville	Pa.	Pa.	2761
4573	Feineman, Wilbur William	Mo.	Mo.	2762
4574	Cole, Maxwell	D. C.	N. Y.	2763
4575	Flood, Bruce Pepper	Japan	Cal.	2764
4576	White, Henry James	Md.	Md.	2765
4577	Erickson, Oscar William	Okla.	Okla.	2766
4578	Alger, Montgomery Meigs	D. C.	Mass.	2767
4579	Sumners, Gilbert Wilson	Ind.	Ind.	
4580	Merwin, Henry Chester	Nebr.	Nebr.	2768
4581	Kirtland, Fred Durrel	Kans.	Kans.	2769
4582	Steele, James Mortimer	Colo.	Colo.	2770
4583	Burhans, Arthur Daniel	Mich.	Mich.	
4584	Blackburn, Casper Kimberlin	Nebr.	Nebr.	2771
4585	Root, Amos Barstow	R. I.	R. I.	2772
4586	Warner, Thomas Dickens	Wis.	Wis.	
4587	Rutledge, Paul White	Ill.	Ill.	2773
4588	Carr, T. De Witt	W. Va.	W. Va.	2774
4589	Rhudy, Albert Manes	Ga.	Ga.	2775
4590	Cecil, Charles Purcell	Ky.	Ky.	2776
4591	Durgin, Calvin Thornton	N. J.	N. J.	2777
4592	Ziroli, Humbert William	Mass.	Mass.	2778
4593	Scott, James Alfred	Ohio	Ala.	
4594	Simms, Julius Ward	Miss.	Miss.	
4595	Miller, William Earl	N. Y.	N. Y.	2779
4596	Chapline, George Frederick	Nebr.	Nebr.	2780
4597	Woodward, Douglas Castleberry	Ga.	Ga.	2781
4598	Forrestel, William John	N. Y.	N. Y.	2782
4599	Rogers, Armistead Calhoun	Tenn.	Tenn.	
4600	Roberts, John Summerfield, Jr.	Ky.	Ky.	2783
4601	Price, John Dale	Ark.	Ark.	
4602	Wynkoop, Norman Osborn	Pa.	Pa.	
4603	Ryan, James Blackburn	W. Va.	Ohio	2784
4604	Jefferis, Leslie Vance	Del.	N. Y.	2785
4605	Schott, William Walter	Kans.	Kans.	2786
4606	Kirtland, Sidney Williamson	Ala.	Fla.	
4607	Hamilton, Stuart Adams	N. H.	Conn.	
4608	Cowles, Walter Bull	N. Y.	Hawaii	2787
4609	Lawson, Joseph Hardin	Mo.	Mo.	2788
4610	Swink, Roy Cleveland	Pa.	Pa.	
4611	Mayfield, Stanwix Greenville, Jr.	S. C.	S. C.	2789
4612	Webb, Richard Ellsworth	La.	La.	2790

No.	Name	State in which born	State from which appointed	No. in Grad. Ass'n
4613	Cochrane, Edwin Fridley	N. Dak.	N. Dak.	
4614	Gilliam, Charles Thaddeus	Tex.	Tex.	
4615	Hoover, Gilbert Corwin	Ohio	Ohio	2791
4616	Cooper, Thomas Valentine	Pa.	Pa.	
4617	Carrington, Walter Spottswood	N. C.	S. C.	2792
4618	Lawrence, Newbold Trotter, Jr.	N. Y.	Mich.	2793
4619	Jones, Roy Kehlor	Okla.	Okla.	2794
4620	Stonestreet, Martin Blackman	Tenn.	Tenn.	2795
4621	Redfield, Heman Judd	N. Y.	N. J.	
4622	Jones, Richard Howard	D. C.	W. Va.	
4623	Cooper, Lowell	Maine	Ga.	2796
4624	Herndon, Linton	Okla.	Okla.	2797
4625	McFall, Andrew Calhoun	S. C.	S. C.	
4626	Fuller, Edward Canfield	Va.	Mich.	2798
4627	Brown, Leon Frederick	Conn.	Conn.	
4628	Jones, Herbert Sidney	N. Y.	N. Y.	2799
4629	Grassie, Herbert John	Mass.	Mass.	2800
4630	Kennedy, Robert Norris	N. H.	N. H.	2801
4631	Jacobsen, Arnold Windom	Iowa	Iowa	2802
4632	Parker, Isaiah	Tenn.	Tenn.	2803
4633	Hilton, Carl Holber	N. Mex.	N. Mex.	2804
4634	Evans, Chaplin Eppes	Va.	Va.	2805
4635	Jenkins, Earle Herndon	Va.	Va.	
4636	Davis, James Kepler	Pa.	Pa.	
4637	Price, George Dorsey	W. Va.	W. Va.	2806
4638	Young, Cassin	D. C.	Wis.	2807
4639	Craig, Carlyle	N. C.	N. C.	
4640	McGinnis, Knefler	Ind.	Ill.	2808
4641	Compton, James Percival	Conn.	Conn.	2809

No. in Grad. Ass'n

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NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It now enters upon its forty-third year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary, and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

Sec. 8. The annual dues for regular and associate members shall be two dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published every two months, and anyone may subscribe for them. The annual subscription is $3.00; single copies, 50 cents. Annual dues for members and associate members, $2.00. Fee for life membership, $30.00.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1917

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1917. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. An essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

J. W. GREENSLADE,
Lieut. Commander, U. S. N., Secretary and Treasurer

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

"A Personnel Reserve for the Naval Service."

"Value of Speed as an Offensive Element in Battleship Strategy and Tactics, as Compared with Armor."

LIST OF PRIZE ESSAYS

1879

Naval Education. Prize Essay, 1879. By Lieut. Comdr. A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Comdr. C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Comdr. F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Comdr. W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to her Pneumatic Battery. Prize Essay, 1894. By Lieut. Comdr. Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Comdr. Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Comdr. Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Comdr. A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A few thoughts on our next step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Comdr. Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

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THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conrad, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

The Great Lesson from Nelson for To-Day. Prize Essay, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. Navy.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

MILITARY PREPAREDNE[illegible] Honorable Mention, 1914. By Naval Constructor Richard D. Gat[illegible] J. S. Navy.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieutenant Commander Dudley W. Knox, U. S. Navy.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieutenant Commander Thomas Drayton Parker, U. S. Navy.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. Navy.

DEFENSE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. Navy.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. Navy.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieutenant Commander J. K. Taussig, U. S. Navy.

EDUCATION AT THE U. S. NAVAL ACADEMY. Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. Navy.

SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. Navy.

LARGE *vs.* A GREATER NUMBER OF SMALLER BATTLESHIPS. Lippincott Prize Essay. By Lieutenant Commander Thomas Lee Johnson, U. S. Navy.